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No. 7903

UNITED STATES CIRCUIT COURT OF APPEALS

FOR THE NINTH CIRCUIT

FRANS VAN DER GRINTEN AND CHARLES BRUNING COMPANY, INC. (a Corporation), *Appellants,*

v.

DIETERICH-POST COMPANY (a Corporation), *Appellee.*

BRIEF ON BEHALF OF PLAINTIFFS-APPELLANTS.

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FRANS VAN DER GRINTEN AND CHARLES BRUNING COMPANY, INC. (a Corporation), *Appellants,*

v.

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Appeal from the District Court of United States for the Northern District of California, Southern Division, at San Francisco, In Equity.

BRIEF ON BEHALF OF PLAINTIFFS-APPELLANTS.

STATEMENT OF THE CASE.

This is an Appeal in Equity in a patent infringement suit. The original Bill of Complaint was filed January 27, 1933; the original Answer was filed March 20, 1933. (R. 7 and 29.) The suit was brought for an injunction and an accounting in the United States District Court for the Northern District of California, Southern Division, by plaintiffs-ap-

pellants, Frans Van der Grinten of Venlo, Limburg, Netherlands, and Charles Bruning Company, Inc., a New York Corporation having its principal place of business in New York, New York, against defendant-appellee, Dieterich-Post Company, a Corporation of California, on account of defendant's use, or sale to others for use, of a sensitized diazotype copying paper and of a developer; known respectively as "Dieterich-Post Diepo Direcprint Paper No. 500 and Developer Therefor", and on account of the use, or sales to others for use, of a certain device known as "No Ink Developer" for applying the developer in a uniformly thin film to an exposed print. By an "exposed print" is meant a print having a white background with a latent image thereon in faint yellow color resulting from exposing the sensitized paper to light through a transparent original of which a positive print is desired. The print is thereafter developed by some means such as the "No Ink Developer" in this instance.

The Bill of Complaint (*see footnote) charged infringement of two separate patents owned by plaintiffs. The first patent, No. 1,821,281, is for Manufacture of Diazotypes and was filed June 6, 1927, by the Van der Grinten brothers, Louis and Karel, as inventors, and issued September 1, 1931, to plaintiff-appellant Frans Van der Grinten, of Venlo, Netherlands, who subsequently assigned to plaintiff-appellant Charles Bruning Company, Inc. The other patent, No. 1,841,653, is for a Process for Developing Positive Diazo Prints, and was filed August 11, 1928, by the same Van der Grinten brothers, and issued January 19, 1932, to plaintiff-appellant Frans Van der Grinten, who likewise

(*Footnote: Before the suit came to trial, several amendments were made both in the Bill of Complaint and in the Answer. After trial, both parties stipulated that for the convenience of the Appellate Court, all of the amendments should be incorporated into reengrossed Amended Bill of Complaint and Amended Answer, respectively, so that the Appellate Court would have complete pleadings before it as single documents. Therefore the Clerk's Filing dates of Amended Bill of Complaint and Amended Answer will appear as subsequent to trial. For stipulation for filing thereof see R. 7 and 29.)

subsequently assigned to plaintiff-appellant Charles Bruning Company, Inc. Title was stipulated to be in plaintiffs (R. 66). Each of the aforesaid patents are based upon applications filed under what is known as the International Convention, as provided by Section 4887, Revised Statutes of the Patent Laws of the United States, (Title 35 U. S. C. A. Sec. 32). Patent 1,821,281 is based upon an application containing the combined subject matter of three applications filed in The Netherlands on December 11, 1926, February 10, 1927, and March 16, 1927, respectively, the earliest effective date of invention of the subject matter of the claims sued on being the filing date of the second-filed application, namely February 10, 1927. Patent 1,841,653 is based upon an application containing the combined subject matter of two applications filed in The Netherlands on August 22, 1927 and May 23, 1928, respectively, the earliest effective date of invention of the subject matter of the claims sued on being the filing date of the first-filed application, namely August 22, 1927. It is therefore apparent that both applications were filed in this country within twelve months from the date of filing the corresponding application in the Netherlands, as provided for by Sec. 4887, U. S. R. S., and are entitled to the dates of filing in The Netherlands.

The first-mentioned patent No. 1,821,281 entitled "Manufacture of Diazotypes", may be conveniently referred to as the *"Reducing Agent Patent"*, and the second one No. 1,841,653 entitled, "Process for Developing Positive Diazo Prints", may be conveniently referred to as the *"Thin Film Patent"*. Both have to do with the making of positive diazotype prints directly from a transparent positive.

During the pendency of the suit, but before the trial, a disclaimer as to claims 7 and 9 of patent 1,841,653 was filed in the Patent Office, and such disclaimer was entered and became a part of the record of the aforesaid patent, in accordance with Sec. 4917, U. S. R. S.; 35 U. S. C. A. Sec. 65. These two claims were not included in the issues at

the trial. Because of this disclaimer after filing suit, costs of suit apportionable to patent 1,841,653 were properly denied pursuant to Sec. 4922 U. S. R. S.; 35 U. S. C. A. Sec. 71.

Claims in Suit.

At the trial the issues were limited to claims 1, 3, 4, 7, 8, 16, 25, 40, and 41 of the Reducing Agent Patent 1,821,281, and to claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18 of the Thin Film Patent 1,841,653. (See Stipulation R. 51.)

Proceedings on Trial.

The case was tried before the late Honorable Frank H. Kerrigan, partly on deposition and partly on evidence taken in open court. The District Court wrote a Memorandum Opinion (R. 30), holding among other things that: 1. Both patents are valid. 2. The invention of the Reducing Agent Patent No. 1,821,281 is a pioneer invention and is entitled to a liberal interpretation. 3. Claims 1 and 25 of the Reducing Agent Patent No. 1,821,281 were infringed. 4. Claims 3, 4, 7, 8, 16, 40 and 41 of the Reducing Agent Patent No. 1,821,281 were not infringed. 5. All of the claims, namely 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18, of the Thin Film Patent No. 1,841,653, sued on, were infringed.

The District Court ordered that an interlocutory decree be entered enjoining defendant from infringing the claims of said patents declared to be infringed and decreeing that plaintiffs were entitled to recover damages and such costs of suit as were apportionable to the first patent No. 1,821,-281, and referring the question of the amount of damages to a Special Master.

With respect to the non-infringement of claims 3, 4, 7, 8, 16, 40 and 41 of The Reducing Agent Patent No. 1,821,281, the Memorandum Opinion states:

> "First, is the *thiourea* present in the light sensitive layer of the Diepo paper sold by defendant a reducing agent? * * * Plaintiffs' experiment indicates that

thiourea resists discoloration to some extent, but that is not the test. Plaintiffs' patent covers the process of arresting discoloration only when accomplished by introducing a reducing agent at some stage of making the print so that it is present in the background of the finished print. Plaintiffs' *theory* of this invention is that the discoloration of the backgrounds is due to the oxidation resulting from the exposure to the atmosphere, and that a reducing agent which remains colorless when oxidized counteracts the tendency of the chemicals in the background to themselves oxidize and darken. Is *thiourea* such a reducing agent? I do not believe that the evidence shows that it is. *It may be that there are circumstances in which thiourea acts as a reducing agent,* but I do not believe that it is important if it does not do so when used in connection with the chemicals present in the backgrounds of diazo prints. Dr. Loevenich's deposition goes to the heart of this question. He testifies that *thiourea* forms an addition compound with a certain chemical present in the background of the finished print and that this compound discolors less easily and is more resistant to oxidation than the substance before reacting with *thiourea.* He also tells of tests which show that *thiourea* is not subject to oxidation. I find that *thiourea* as used in the light sensitive layer on defendant's paper is not a reducing agent, although it does arrest discoloration. This was the view taken by the German Patent Office in ruling on the opposition by the Van der Grintens to the first Kalle patent. The claims of this patent which call for the presence of a reducing agent in the light sensitive layer on the paper, namely claims Nos. 7, 8, 16, 40 and 41 are not infringed." (Italics ours)

Subsequent to the decision of the District Court, Finally Approved Findings of Fact and Conclusions of Law were submitted and entered (R. 36), to which plaintiffs and defendant filed exceptions (R. 45 and R. 48). The Court then entered an Interlocutory Decree enjoining the defendant, and ordering an accounting (R. 53).

The case now comes before this Court on an appeal by plaintiffs from that portion of the Interlocutory Decree

ordering, adjudging and decreeing that defendant has not infringed claims 1, 3, 4, 7, 8, 16, 40, and 41 of patent No. 1,821,281 *with respect to thiourea.* Appellee has not filed a cross-appeal at all either as to that portion of the Decree holding both patents valid or as to those claims which were decreed to be infringed.

Inasmuch as plaintiffs-appellants have assigned as error, among other things, the failure of the Court to hold that certain claims of the Reducing Agent Patent No. 1,821,281 were infringed by Thiourea, this Brief will first discuss the history of the art, the Van der Grintens' discovery, the commercial success, the pioneer character of the patent and the validity thereof, and then the infringement by Thiourea, and will subsequently discuss the claims and the Thin Film Patent, which the District Court held has been infringed, and, as to which, the defendant-appellee has filed no cross-appeal.

ERRORS RELIED UPON.

The errors assigned (R. 446) may be briefly summarized as follows:

1. That the Court erred in making certain holdings in the Decree.

2. That it was error to find non-infringement of claims 3, 4, 7, 8, 16, 40 and 41 of the Reducing Agent Patent No. 1,821,281.

3. That it was error to find defendant's process and products were not within claims 3, 4, 7, 8, 16, 40 and 41. of the Reducing Agent Patent No. 1,821,281.

4. That the Court erred in holding *thiourea* must act as a reducing agent when present in the background of the finished diazotype print to come within the claims of the Reducing Agent Patent No. 1,821,281, particularly claims 1, 3, 4, 7, 8, 16, 40 and 41.

5. That the Court erred in

a) not giving the Reducing Agent Patent No. 1,821,281 the liberal interpretation of a pioneer patent to which it found said patent was entitled.

b) not decreeing that *thiourea* when used in the background of positive diazotype prints was equivalent to sodium *thiosulphate* which was held to be an infringement and that *thiourea* was an equally good ingredient and accomplished the same result in the same manner as other reducing agents, including sodium *thiosulphate* which was held to be an infringement of said patent.

6. That it was error to hold *thiourea* is not such a reducing agent which remains colorless when oxidized and which counteracts the tendency of the chemicals in the background to themselves oxidize and darken.

7. That the Court erred in finding that plaintiffs must prove that *thiourea* as used in the light sensitive layer on defendant's paper is a reducing agent in connection with the chemicals present in the background of a positive diazotype print made with defendant's paper.

BASIS OF ERROR IN DECREE OF DISTRICT COURT.

The Trial Court found that *thiourea* present in the light sensitive layer of the Diepo paper sold by defendant acts to arrest the discoloration of the background of finished diazotype prints; that *thiourea* may be a reducing agent under some circumstances; that claim 1 was infringed by sodium *thiosulphate* but not by *thiourea;* and that claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 were good and valid. In spite of these findings the Trial Court held that *with respect to thiourea* claims 1, 3, 4, 7, 8, 16, 40 and 41 of patent 1,821,281 are not infringed because the evidence *fails to prove* that *thiourea* acts in a reducing manner *in the environment of the chemicals in the back-*

ground of a diazotype print. There is nothing in the description and there is no limitation in the claims of this patent which specifies that the reducing agent shall act in a *reducing manner in the background of the finished print.* The Court's error in holding that the aforesaid claims are not infringed appears to be based upon the erroneous assumption that a patentee must prove the theory of action of the chemicals employed in the process. *The Reducing Agent Patent is not limited to a theory of action of chemicals in arresting discoloration of the background of the print and the claims of the patent contain no limitation of a theory of action of chemicals in the background of the print.* Moreover, the Court's holding is contrary to the requirements of the law which does not require a patentee to even state a theory much less prove a theory of action of chemicals used in the process. All that the law requires is that a patentee set forth the process or mode of operation in such full, clear and concise terms as to enable a person skilled in the art to obtain the patentee's results and that a patentee disclose one means for carrying the process or mode of operation into practice. It is not essential or necessary that the patentee either understand or set forth a theory of the action of chemicals involved in the process.

The District Court held that the Reducing Agent Patent No. 1,821,281 was a pioneer patent and was entitled to a liberal interpretation, but in spite of this holding, failed to give any consideration to the doctrine of liberal interpretation accorded pioneer patents or any consideration to the doctrine of equivalents. *Thiourea not only comes within the definition of a reducing* agent *but likewise is a clear equivalent of sodium thiosulphate which has been held to be an infringement.* Defendant-appellee infringes the claims 1, 3, 4, 7, 8, 16, 40 and 41 of the Reducing Agent Patent because *thiourea* was proven to be a reducing agent and was capable of arresting discoloration of the background of diazo prints and furthermore accomplished the

same results in the same manner and was equally good for the purpose as sodium *thiosulphate* which was held to be an infringement. *Thiourea,* therefore, comes within the doctrine of equivalents in accordance with well established and recognized law.

It is our earnest belief that the questions presented on this appeal are largely questions of the correct application of well established doctrines of patent law, and that if the Trial Court had correctly applied the law, a finding of infringement of the aforesaid claims would have been the inevitable result.

HISTORY OF THE ART.

In the testimony of Dr. Van der Grinten (R. 112-115) and in the specification of the Reducing Agent Patent (lines 39-79 of page 1), there is a clear and vivid picture given of the history of the art. It will be seen that one of the first technical processes for obtaining positive diazotype prints was invented by Green, Cross and Bevan. Their processes were disclosed in German patent No. 56,606 of September 3rd, 1890. These patentees used a diazo derivative of the dyestuff primuline as a sensitive substance and after exposure of the print developed it in the bath containing an azo dyestuff component and generally an alkali.

In 1895, Andresen found that diazo compounds other than derivatives of primuline could be used in the light-sensitive layer.

In 1901, Ruff and Stein, likewise, found and disclosed that still other diazo compounds could be used in the sensitive layer of the diazo print. Their discovery was published in Berichte 34, 1901, 1668.

The art lay dormant for more than twenty years before any other discovery in diazo prints was made known to the world. In about 1924, Kalle invented a diazo print which carried not only the diazo compound but also the azo dyestuff coupling component in the sensitive layer.

In the Kalle process the print was developed with ammonia fumes.

The principal objection to and defect of these old diazo prints was that the background was subject to discoloration. After the prints had been in use for a little while or after having stored the prints in the drawer, file, cabinet or the like, the background became discolored. Due to the discoloration, the value of the print was impaired and ultimately rendered practically useless. This was particularly true in connection with many of these old diazo prints which were imperfect and which did not have sufficiently dark and clear-cut image lines with sufficiently clear bleached background.

The art was struggling with the outstanding problem of the discoloration of the background of diazo prints and of endeavoring to find a solution to the problem by which the art would be provided with a satisfactory and acceptable diazo print which possessed sharp and clear-cut image lines with a white bleached background which was not subject to discoloration in the course of time. The diazo print had to be capable of being produced on an industrial scale and had to be capable of being used commercially. Although many proposals and attempts had been made, none had successfully solved the outstanding problem and none had provided the art with the satisfactory and acceptable diazo print, the background of which was not subject to discoloration.

THE VAN DER GRINTENS' DISCOVERY.

The inventors, the Van der Grinten brothers, had been engaged in the photographic reproduction art in Holland since the World War. They became aware of the problem confronting the diazotype art and investigated the possibilities of solving the problem and providing the art with a satisfactory diazo print having a background which was not subject to discoloration. After a thorough investigation and

analysis of the problem and after a great deal of experimentation, the source of the trouble involved in the discoloration of the background of diazo prints was discovered. After discovering the cause, the Van der Grintens conducted further experimentation and discovered the remedy for the difficulty.

In or about 1926 or 1927, the inventions involved in the Reducing Agent Patent, No. 1,821,281, and the Thin Film Patent, No. 1,841,653, were made. Due to the Van der Grintens' inventions, the art was provided with a satisfactory, successful and acceptable positive diazo print having a background in which the discoloration was arrested for extended periods of time. The essence of the discovery of the Reducing Agent Patent was the inclusion in the background of the finished print of a reducing agent capable of arresting the discoloration of the background.

The Van der Grintens' discovery was so remarkable that it revolutionized the art and established a new industry and met with great commercial success. The Trial Court held that the invention involved in the Reducing Agent Patent is a *Pioneer Invention.*

THE COMMERCIAL SUCCESS OF THE REDUCING AGENT PATENT NO. 1,821,281 ESTABLISHES THE PATENTABILITY AND THE PIONEER CHARACTER THEREOF.

The invention of the Reducing Agent Patent revolutionized the diazotype art and had immediate commercial success in Europe (R. 114-115). The Van der Grintens, the patentees, thereupon also made applications for the patents in the United States which are here in suit, and while those applications were pending, Dr. Van der Grinten consummated a commercial arrangement with the Plaintiff, Charles Bruning Company. The Charles Bruning Company has commercially exploited the inventions of the patents in suit in the United States, and these inventions have likewise revo-

lutionized the diazo print art in the United States. The sales in United States alone which were begun in 1929, rapidly mounted from year to year. A good idea of the growth of the sales may be gained from the following schedule:

Year	Sensitized Paper	Developer
1929	127,000 Square Yards	2,300 Cans
1933	975,000 Square Yards	23,000 Cans

In other words, there was an increase of approximately One Thousand (1,000%) per cent in four years. To the time of the trial, 4,500,000 square yards of paper and 100,000 cans of developer were sold. (R. 205.) The commercial success enjoyed by the Charles Bruning Company in the exploitation of the Reducing Agent and Thin Film Patents has been remarkable and the acceptance and recognition by the trade has been very impressive.

The Charles Bruning Company, one of the outstanding long-established firms in the blue-print, photostat and reproduction business in the United States, immediately recognized, through its background of experience, the technical value and commercial importance of the Van der Grintens' inventions. They paid tribute to the Van der Grintens by contracting to pay $30,000 for rights under the inventions of the two patents in suit. (R. 203-204.)

To the highest degree that commercial success ever counts in favor of patentability, it must do so in the present case because of the long period and wide expanse of commercial barrenness that preceded it.

Where an invention produces a new industry, revolutionizes the art and goes into immediate commercial success, patentability is present and cannot be denied.

Diamond Rubber Co. v. *Consolidated Rubber Tire Co.*, 220 U. S. 428; 55 L. Ed. 527.

Eibel Co. v. *Minnesota and Ontario Paper Co.*, 261 U. S. 45; 67 L. Ed. 523.

Wahl Clipper Corp. v. *Andis Clipper Co.*, 66 Fed. (2nd), 162 (C. C. A. 7).

O. K. Jelks & Son v. *Tom Huston Peanut Co.*, 52 Fed. (2nd), 4, 7.
Hughes Tool Co. v. *International Supply Co.*, 47 Fed. (2nd), 490 (C. C. A. 10).
Permutit Co. v. *Harvey*, 279 Fed. 713 (C. C. A. 2).
Sherman Clay Co. v. *Searchlight Horn Co.*, 214 Fed., 86 (C. C. A. 9).

THE REDUCING AGENT PATENT NO. 1,821,281 IS A PIONEER PATENT AND COVERS THE MANUFACTURE OF DIAZOTYPES CONTAINING REDUCING AGENTS.

The invention of The Reducing Agent Patent No. 1,821,281 has to do with the manufacture of positive diazo prints, commonly called diazotypes. Positive diazotypes are photographic reproductions (prints) and are called diazotypes because the print is derived from a copying paper having a light sensitive layer thereon containing one or more diazo compounds. A positive print has a white or light colored background with an image of dark or black or other color standing out in bold relief on such background. The reason it is called a diazotype print or more commonly termed "diazotype" is because a diazo compound plays an essential role in making the entire print, namely, the white background and the colored image.

Diazo compounds suitable for making diazotype prints have two special properties, namely, they are:

1. sensitive to light, decomposing to give initially white products but tending to become yellow.
2. capable of combining or coupling with a chemical termed an azo dyestuff coupling component to form an azo dyestuff or color.

Diazo compounds practicable in the diazotype process usually are of a yellowish or brown color, and when exposed to light commonly used in photographic reproduction work, are decomposed into other chemical compounds which are

practically white in color. When the diazo compounds are brought together with an azo dyestuff coupling component in an alkaline medium, a dyestuff having a dark or black or other color is produced. (R. 71-72)

In the making of a positive diazotype print directly from a positive transparent tracing, drawing, picture, etc. of which a print is desired, the transparent tracing is placed on top of and in contact with the face of a copying paper which has thereon a light sensitive layer containing a diazo compound. The sensitive layer is exposed through such tracing to light which is commonly used in photographic reproduction work. (R. 71, and Plaintiffs' Exhibit No. 7, Chart of Prior Art, R. 83.) During the exposure, the light passes unhindered through the transparent portion of the tracing between and surrounding the image lines of the tracing and strikes or impinges upon the exposed portions of the sensitive layer of the copy paper underneath. The action of the light on these exposed portions of the sensitive layer causes the diazo compound of such portions to be decomposed and thereby changed from the original faint yellow color to a practically white color thereby forming what is called the background of the print. When the exposure is completed, the tracing is separated from the diazotype copying paper. At this point of the procedure, the diazotype copying paper has the latent image in faint yellow outline corresponding to the image of the tracing standing out in faint relief on a white background. (R. 73, and Plaintiffs' Exhibit No. 7, Chart of Prior Art, R. 83.) To complete the print and thus change the faint yellow image to a permanent black or dark or other color, the diazotype copying paper is next subjected to the action of a chemical developer containing an azo dyestuff coupling component and a suitable alkaline substance, such as sodium carbonate, to make the liquid medium alkaline. This may be done by simply dissolving the azo dyestuff coupling component and an alkaline substance like sodium carbonate in water, to form a solution and then ap-

plying such solution in a suitable manner such as by submerging the print in the solution. This treatment with the developer causes the faint yellow image to be converted to a permanent dark or black color due to combination of the diazo compound of the latent image with the azo dyestuff coupling component of the developer. The print is then dried. This results in the formation of a finished positive diazo print which has a dark or black image standing out in bold relief on an initially white background. (R. 73-74 and Plaintiffs' Exhibits Nos. 30 and 33.)

An alternative method of procedure is as follows: In place of using a diazotype copying paper having a sensitive layer containing the diazo compound only, a copying paper with a sensitive layer thereon containing both the diazo compound and the azo dyestuff coupling component may be used, but in this latter case it is necessary to have an acid present in the sensitive layer in order to prevent the two compounds from reacting with each other before exposing and developing. In the language of the art, the presence of the acid in a sensitive layer of this nature is to *prevent premature coupling* before exposing and developing. When a diazotype copying paper of this latter type is used, a developer which contains only an alkali and not an azo dyestuff coupling component is employed because the coupling component is already present in the sensitive layer or coating on the surface of the copying paper. The alkali of the developer may be a non-volatile alkali like sodium carbonate, or may be a volatile alkali like ammonia fumes. (R. 74-77.)

The initially white backgrounds of positive diazotype prints made in accordance with either of the aforesaid procedures show a pronounced yellowing or browning within a short time when kept for record purposes in a desk drawer or filing cabinet or when left on a desk or table for reference and use. (R. 78-79.)

The invention of the Reducing Agent Patent No. 1,821,-281 is concerned with *the arrest of discoloration of the back-*

ground of the finished print, not with the discovery of the cause of it. The inventors first discovered the cause and then provided the remedy. (R. 79-80.) The Reducing Agent Patent teaches the art how to arrest discoloration of the backgrounds of diazotype prints.

By the invention of The Reducing Agent Patent No. 1,821,281, the defect of discoloration in all types of diazotype processes can be arrested even for extended periods if a reducing agent that acts to arrest the discoloration is present in the background of the finished print. (R. 80.) Such reducing agent may be incorporated in the print at any stage of its manufacture as explained clearly and fully in the specification of the Reducing Agent patent. It may be added to the sensitive layer of the copying paper or to the developer or to both the layer and the developer or after development. The teaching in the patent is that the reducing agent be present in the finished print or picture. (R. 80-83, and Plaintiffs' Exhibit No. 8, Chart entitled Invention in Patent 1,821,281; R. 83.) The patent covers the process of arresting discoloration of a background of a print by introducing a reducing agent at any stage of making the print so that it is present in the background of the finished print. The patent points out types and particular examples of types of reducing agents which are preferred, and the important thing about them is that, when they are present in the background of the finished print, the background resists discoloration to an appreciable extent for extended periods. (Lines 55-64 of page 2 and examples 1-7 on pages 4 and 5 of patent 1,821,281.)

CLAIMS OF THE REDUCING AGENT PATENT NO. 1,821,281 DEFINE THE INVENTION AND ARE NOT UNWARRANTEDLY BROAD.

Claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 of the Reducing Agent Patent No. 1,821,281 are charged to be infringed and the Lower Court held all of these claims to be valid but

only claims 1 and 25 to be infringed. For convenience, a copy of the patent appears in the Transcript of Record at page 464.

Claim 1 of the patent which has been held to be valid and infringed is representative of the process claims 3 and 4 and reads as follows:—

> "The process of rendering the background of the diazotype prints substantially stable against discoloration which comprises including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints."

It will be observed that the claim specifies including a substance which is a reducing agent and which is capable of arresting under normal conditions discoloration in the background of the print. In other words, claim 1 defines the Van der Grintens' process of arresting discoloration in the background of diazotype prints and specifies that the substance used for this purpose is named

1. a reducing agent

and is

2. capable of arresting under normal conditions the discoloration of the components forming the background of said prints.

It is to be noted that not a single word is mentioned in claim 1 regarding how the substance acts in the background of the print. The claim teaches those skilled in the art to *include in the background of the print a reducing agent capable of arresting discoloration.* The teaching is simple and the language is clear. It does not require a person skilled in the art to investigate whether a substance acts as a reducing agent in connection with the chemicals present in the backgrounds of diazo prints before using it. In distinct contrast, the claim particularly teaches the art to use a substance known in chemistry as a *"reducing agent"* which

is capable of arresting discoloration of the background of the prints. *If the substance is known as a reducing agent in chemistry and if the substance is capable of arresting the discoloration as described, then such a substance is within claim 1.* Both of the characteristics of the substance are capable of being ascertained easily and quickly. *Under no circumstances, does the claim require those skilled in the art to determine how the substance acts in the background or to determine the kind of chemical action occurring therein.* Defendant experienced no trouble at all in following the teachings of the patent and of the claim and in selecting *thiourea* which is (1) a reducing agent and which is (2) capable of arresting discoloration in the background of the print.

Claims 3 and 4 are similar to claim 1 except claim 3 calls for *"a reducing aliphatic compound"* and claim 4 calls for *"a reducing amino compound"*.

Claims 7, 8, 16 and 25 are patterned upon the spirit of claims 1, 3 and 4, except that they call for further specific steps. Claims 7 and 8 are concerned with a process of applying to a base a layer containing a diazo compound bleaching on exposure to light and a reducing agent capable of arresting under normal conditions the discoloration of the background of the print, then exposing the layer to light in conjunction with a tracing, etc., and finally contacting the exposed layer with a developer containing an azo dyestuff coupling component. Claim 16 is similar to claims 7 and 8 except that it specifies that the developer also contains a reducing agent. Claim 25 is likewise similar except that the reducing agent is used only in the developer.

Claims 40 and 41 are product claims. For convenience claim 40 reads as follows:—

> "As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of the finished print."

This claim defines a copying paper having a sensitive layer containing a diazo compound bleaching upon exposure to light and a reducing agent, such as *thiourea,* capable of arresting the discoloration of the background of the print.

As for the claims of the Reducing Agent Patent, we do not claim a result; others may accomplish the result in a different way, for example, by employing substances other than reducing agents or equivalents thereof.

Defendant raised the question as to whether the Reducing Agent Patent covered both organic and inorganic reducing agents. However, there is no limitation in the patent as to a particular type or class of reducing agents which may be used. The patent broadly discloses the use of reducing agents, among which certain classes of organic reducing agents are the preferred, and species of these preferred classes are described. Besides, seven specific examples are given of some of the forms by which the invention may be carried out. Dr. Van der Grinten testified that the reducing agents in the sense of the patents may be organic or inorganic. (R. 91-93.) Defendant's expert Dr. Lazar testified that under the terms of the patent there was no limitation solely to organic reducing agents. (R. 332-334.)

Defendant-appellee has contended that the claims of the patent were improper and were too broad because they attempted to define a result. Of course, this contention is without foundation and is untenable. As a matter of fact, the Trial Court held that the claims of the patent when read in connection with the specification and the examples are not unwarrantedly broad, and held that the claims are valid. (R. 31.)

The claims of the Reducing Agent patent are of the type deemed proper by the court in the case of *General Electric Co.* v. *Nitro Tungsten Lamp Co.,* 266 Fed. 994, wherein at 1000, it is stated:—

> "It was impossible to give exact measurements, because the economic object of the lamp was to diminish

> the wattage per candle, and dimensions must be proportioned to the designed wattage *i. e.,* substantially to the size of the lamp, something to be worked out according to rules presumably long familiar to a competent electrical engineer. *It was unnecessary to do more than state the limits of the invention in terms of result because the results desired are not functional,* and do indicate limits in terms of lamp life and candle power which are likewise presumably quite familiar to any competent electrician. *When a claim defines achievement in words no broader than the disclosure and in phrases which, as interpreted by competent workers in the art, tell one how to do what the patentee did, it can rarely be called indefinite.''* (Italics ours)

and by the Supreme Court of the United States in *Tilghman* v. *Proctor,* 102 U. S. 707; 26 L. Ed. 279, where at 728 the Court states:—

> ''The mixing of certain substances together, or the heating of a substance to a certain temperature is a process. If the mode of doing it, or the apparatus in or by which it may be done, is sufficiently obvious to suggest itself to a person skilled in the particular art, it is enough in the patent, to point out the process to be performed, without giving supererogatory directions as to the apparatus or method to be employed. If the mode of applying the process is not obvious, then a description of a particular mode by which it may be applied is sufficient. There is, then, a description of the process and of one practical mode in which it may be applied. Perhaps the process is susceptible of being applied in many modes and by the use of many forms of apparatus. The inventor is not bound to describe them all in order to secure to himself the exclusive right to the process if he is really its inventor or discoverer. But he must describe some particular mode or some apparatus by which the process can be applied with at least some beneficial result in order to show that it is capable of being exhibited and performed in actual experience.''

In the same case (*Tilghman* v. *Proctor*), the Supreme Court quotes Chief Justice Taney in *O'Reilly* v. *Morse*, 15 Howard 119:—

> "It seems to us that this clear and exact summary of the law affords the key to almost every case that can arise. 'Whoever discovers that a certain useful result will be produced in any art by the use of certain means is entitled to a patent for it, provided he specifies the means.'
>
> * * * * * * * * *
>
> "It is very certain that the means need not be a machine, or an apparatus; it may as the court says, be a *process.*" (Italics by the Court.)

The claim which the Court had under submission was:

> "The manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure."

The claim was sustained as valid. The present case is on all fours with the foregoing and the analogy of the claims of patent here in suit may be demonstrated by a comparison:—

Claim in Tilghman v. Proctor	*Claim 1 of Patent 1,821,281 here in suit.*
(*Premise*)	(*Premise*)
The manufacturing of fat acids and glycerine	The process of rendering the background of the diazotype print substantially stable against discoloration.
(*New step of the Process*)	(*New step of the Process*)
by the action of water at a high temperature and pressure.	including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints.

Neither of these claims claim a principle, result or function. In one instance, others might use a process for manufacturing fat acids and glycerine in other ways than by action of water at a high temperature and pressure; in the other instance, others might use a process for rendering the background of the diazotype prints substantially stable against discoloration, in other ways than by including therein a reducing agent capable of arresting discoloration. It is not objectionable to describe the reducing agent by its function or by the result it accomplishes. That is not claiming the result, nor the function. It is claiming a means for accomplishing a result. That means is a *reducing agent;* and not even every reducing agent but only those reducing agents which are capable of arresting the discoloration of the print under normal conditions. Van der Grintens discovered in this art that discoloration was due to oxidation, and they invented the means to overcome the difficulty, as did Bell in the *Telephone Cases* in which it was held that:—

> "In doing this, both discovery and invention in the popular sense of those terms, were involved; discovery in finding the art, and invention in devising the means of making it useful. For such discoveries and such inventions the law has given the discoverer and inventor the right to a patent—as discoverer, for the useful art, process, method of doing a thing he has found: and as inventor, for the means he has devised to make his discovery one of actual value. Other inventors may compete with him for the ways of giving effect to the discovery, but the new art he has found will belong to him and those claiming under him during the life of his patent." *Telephone Cases,* 126 U. S. 1; 31 L. Ed. 863.

The claims here are also of the types sustained as valid by the Circuit Court of Appeals for the Second Circuit in the *"Pectin Case"* from which sustained claims claim 5 of Patent 1,304,166 is quoted:

> "5. The process of making fruit jellies consisting in adding to fruit juice a given quantity of sugar and a

proportional quantity of concentrated fruit pectins sufficient to jellify the mass without prolonged boiling."

Douglas Pectin Corporation v. *Armour & Co.*, 27 Fed. (2d) 815; (C. C. A. 2.)

From the foregoing claim, it will be noted that adding sugar to fruit juice was old and that pectin as a fruit acid product was old. The patentability resides in the fact that the patentee was the first to discover that pectins could be added to a batch of fruit and sugar in an amount sufficient (or capable) to jellify the mass without the usual old-fashioned prolonged boiling.

Likewise, in the patent in suit No. 1,821,281 there were known methods of making diazotype prints, but the art did not know how to prevent discoloration of the background. Reducing agents, as such, were well known in the chemical arts, the same as pectin was a known substance in the preserving arts. The Van der Grintens discovered the cause of the discoloration and discovered the step in the process of introducing a reducing agent into the background of the finished print capable of arresting the discoloration. The same inventive and patentable effect was accomplished as was accomplished by the patentee in the pectin patent when he introduced pectin in an amount sufficient to jellify the batch of fruit without prolonged boiling.

Similar claims were sustained by District Judge Campbell as follows:—

Patent No. 1,564,378, claim 3:

"3. As an article of manufacture an unbleached fur skin or the like suitable for bleaching and being impregnated with a solution of ferrous salt."

Patent No. 1,573,200, claim 1:

"1. The method of bleaching fur skins and the like which comprises treating the fibers with an oxidizing agent in the presence of a protecting agent comprising a reducing compound."

Stein v. *Windsor*, 31 Fed. (2d) 128.

This type of claim is patentable because the invention accomplishes a new result or an old result in a better way, even though the means for accomplishing the result may be old but is used in a new environment to accomplish a new use and a novel and beneficial result which had theretofore not been known. In view of the aforesaid decisions, there cannot be the slightest doubt that the claims involved herein in the Reducing Agent Patent are proper and valid as held by the Trial Court and are of the same type which have been sustained by our courts in a long line of decisions including the aforementioned famous ones of the Supreme Court.

PRIOR ART AFFIRMS PATENTABILITY OF THE REDUCING PATENT NO. 1,821,281.

Of the many prior patents and publications set up in the Answer, only one single U. S. Patent No. 1,444,469 to Kogel of Kalle & Company (Defendant's Exhibit C; R. 66) has been urged as an anticipation against the claims of the Reducing Agent Patent No. 1,821,281. Defendant-appellee has also attempted to urge the process of making the so-called Brown or Negative Prints as an anticipation of the claims of The Reducing Agent Patent.

The Kogel U. S. Patent No. 1,444,469 of Kalle & Co. urged by defendant-appellee as an anticipation is a duplicate as regards subject matter of the British Kalle & Co. Patent No. 210,862 which is referred to in line 57 of page 1 of The Reducing Agent Patent No. 1,821,281. Defendant-appellee has admitted this by stipulation at R. 328. A copy of the aforesaid British Patent is in evidence as Plaintiffs' Exhibit No. 20 (R. 116). Kalle & Co., the owner of the aforesaid U. S. and British Kogel Patents, is the same Kalle & Co. which, Dr. Van der Grinten has testified (R. 200) has taken a license under Van der Grintens' foreign patents in nearly all countries of the world.

Plaintiffs-appellants' expert, Dr. Van der Grinten has testified (R. 113) that the process of the Kalle British Patent is the same as that illustrated in the right-hand (erroneously designated as left-hand at R. 113) part of Exhibit No. 7 (Plaintiffs' Exhibit No. 7, Chart of Prior Art, R. 83). Dr. Van der Grinten testified (R. 75-77) that such process as illustrated on the right-hand (erroneously designated as left-hand) part of Exhibit No. 7, involves the use of a copying paper having a sensitive layer thereon which contains both the diazo compound and the azo dyestuff coupling component and sufficient acid for the purpose of preventing the premature coupling of the diazo compound with the azo dyestuff coupling component before printing and developing. The development of such a sensitive layer after exposure is effected by either ammonia fumes or by a bath containing a non-volatile alkali like sodium hydroxide. Dr. Van der Grinten also testified (R. 156) that the acid used in the layer according to the process described in the British Kalle patent is either tartaric or citric acid, and that the purpose of the addition of such acid to the sensitive layer is *solely* to prevent the premature formation of the azo dyestuff by the interaction of the two components in the layer during handling, shipping, storing and merchandizing and before use in making and developing a print.

Dr. Van der Grinten testified (R. 160) that he has personally made tests according to example 3 of the British Kalle patent aforementioned, and that, although a very small residual amount of sodium citrate or sodium tartrate was present in the finished print depending upon whether tartaric or citric acid was added to the sensitive layer, he never could find that this residual amount of citrate or tartrate did in any way arrest discoloration to an appreciable extent.

With reference to this British Kalle Patent, Dr. Van der Grinten testified (R. 199-200) that such patent indicates the quantity of tartaric or citric acid which should be added

to the sensitive layer, and that such quantity is so small that the tartrate or citrate formed and remaining in the finished print is insufficient to counteract the discoloration of the background of the finished print. Besides, the purpose of the Kalle patent in adding these acids to the sensitive layer was not to arrest discoloration of the finished print but to acidify the sensitive layer and to prevent premature coupling of the diazo compound and azo dyestuff coupling component. This fact was clearly recognized by the Court. (R. 199.)

> "Q. With respect to the British Patent to Kalle, 210,862, does this patent state anything as to the quanity that is required to be used?
>
> "A. It certainly does. On page 1, lines 80 to 83, the patent says: 'To obtain still greater stability of the light sensitive layer small additions of acid such as tartaric or citric acid are made.' In Example 3, in the same patent, 'In 1000 parts of water there are used 5 parts by weight of tartaric acid.' Consequently the tartaric acid is applied to the paper in a solution ½ per cent strong.
>
> "Q. Then in the Kalle patent the tartaric acid is not added in an amount sufficient to arrest the discoloration of the background of the finished print?
>
> "A. In the Kalle patent the tartaric or citric acid is not used in a quantity sufficient to form in the finished print tartrates or citrates in an amount sufficient to counteract the discoloration of the finished print in a way which would be at all appreciable.
>
> The Court: "Q. That was not one of the purposes of the patent, either, was it?
>
> "A. It was in no way the purpose of the patent for adding these acids. The patent adds the acids to prevent a premature reaction between the diazo compound and the azo component in the sensitive layer or (*before*) exposure because when such a reaction would have taken place then, of course, there would have been no more diazo compounds present and the whole process, which is based upon the particular properties of the diazo compound, could not have been carried out." (*before*) erroneously omitted at R. 200.

With regard to the corresponding Kogel U. S. patent of Kalle & Co. advanced as an anticipation, *defendant-appellee's expert, Dr. Lazar, has admitted* (R. 298-299) *that the term "reducing agent" does not appear at any place throughout this patent and, besides, there is not one word in such patent concerning the discoloration of the background of the finished print.* Dr. Lazar has admitted (R. 300) that the sentence beginning in line 78 of page 1 and ending at line 80 of the same page of this Kogel patent, reads as follows:

> "To obtain still greater stability of the light sensitive layer *small additions of acid,* such as tartaric or citric acid are made." (Italics ours)

and (R. 304) that according to the quoted sentence the purpose of adding the acid to the sensitive layer is to prevent the premature coupling of the diazo compound and the azo dyestuff coupling component and, further, that the purpose of preventing premature coupling of the sensitive layer is *entirely different* from the purpose of arresting discoloration of the background of the diazotype print.

Dr. Lazar has likewise admitted (R. 304-305) that he has not practiced the process of example 3 of the Kogel U. S. patent which example is the same as example 3 of British Patent No. 210,862 (Plaintiffs' Exhibit No. 20), and that he does not know whether a print made according to such example will or will not discolor in the background after extended periods of storage.

It is a well settled rule that uncontemplated or accidental results in a prior patent do not anticipate a patent in which a full disclosure is made. This is the rule as laid down in the case of *United Verde Copper Co.* v. *Pierce-Smith Converter Company,* 7 Fed. (2d) 13, where at page 16 the Court states:

> "If in this operation Heywood's workmen at any time hit upon the amount and composition of the flux required by the Smith process and attained its result,

> it was purely accidental and was without profit to the art and without value as an anticipation."

and at page 17:

> "Moreover, were the question of invention closer than it seems to be, the position which the invention promptly took in the art would aid in deciding it, for it is recognized that the fact that an art has long presented a problem and that the process of a patent has solved it, as well as the fact that the process has gone into large general uses and has produced new and economical results, speak for its inventive character."

This rule has been recognized by our Courts and has been well settled by the Supreme Court of the United States in *Tilghman* v. *Proctor, supra.*

Sepia or Brown Prints.

Defendant has attempted to bring into the case the prior art process of making brown prints, as an anticipation, Brown prints are known in the art by a number of various names, to wit: Sepia, Van Dyke, Brown, Negative or Brown-line prints. Apparently, this Brown Print process was brought into the case because sodium thiosulfate commonly known as "hypo" is used in fixing the print. Brown prints, the materials used therein, or the process of making or using the same, have nothing to do with the diazotype prints involved in the present suit.

In the making of a brown print (R. 189-191) a transparent original tracing, etc., of which a print is desired, is placed upon a copying paper having a sensitive layer thereon containing a silver compound and a ferric salt, and exposing the sensitive layer to light through said original. During the exposure the light passes unhindered through the transparent portions of the original tracing, etc. to the corresponding portions of the sensitive layer underneath. The light upon reaching these portions of the sensitive layer causes the silver compound and ferric salt to react

together and thereby form a brown color. In those portions of the sensitive layer protected by the image lines of the original and through which the light could not penetrate, the silver compound and ferric salt of the sensitive layer remain unaltered and in their original state. Thus, the exposed print consists of a brown background with a white image. To convert this exposed print to a finished print, it is necessary to subject it to a fixing operation, which is really the removal of all of the unreacted chemicals remaining on the print. This fixing operation involves first, a thorough washing with water, next a washing with sodium thiosulfate, and finally a second washing with water. The first washing removes all of the water soluble compounds but does not remove the insoluble silver compound. The washing with thiosulfate converts the insoluble silver compound into a water soluble one. The second washing with water washes the water soluble compound formed as a result of the thiosulfate treatment from the print. In other words, the second washing removes the water soluble silver compound *and the thiosulfate* from the print. After the fixing operation, the print obtained is a negative, that is, a print having a white image on a brown background.

Dr. Van der Grinten testified (R. 189-190) that the Brown Print process produces negative prints, and that the sodium thiosulfate is used in such process as part of the fixing operation, namely the removal of the insoluble silver compounds from the print. Defendant's witness, Mr. Duncan, corroborates this (R. 422-423). Mr. Duncan testified (R. 415) that to get a positive or brown-line print it is necessary to make a reprint from the negative made by the brown print process.

The very purpose of the *positive* diazotype involved in the present suit is to make a *positive* print directly from a transparent *positive* tracing and thus *eliminate* the necessity of an intermediate negative as in the Brown Print Process. Obviously, in a negative the background is opaque and is brown so that no problem of discoloration of a white

background as in Diazo Prints is involved (R. 142-144; 189-192).

A comparison of the old brown print with the present diazotype print will clearly bring out the distinction existing between the two prints. For convenience, the following comparative schedule is given;—

	Brown Print	Diazotype Print
Components of Sensitive Layer	Silver Compound Ferric Salt	Diazo Compound
Latent Image After Exposure Beneath a Transparent Positive Original	Brown background Unaltered silver compound and ferric salt in lines or parts of image.	White background Unaltered diazo compound in lines or parts of image.
Treatment required to change latent image to finished print	Wash with water to remove soluble compounds. Wash with thiosulfate to convert insoluble silver compound into soluble one. Wash with water to remove soluble silver compound and thiosulfate.	Add alkaline developer containing: (1) Azo dyestuff coupling component, to combine with unaltered diazo compound to form black or colored lines or parts of image and (2) Thiosulfate (reducing agent) to remain permanently in background in sufficient amount to arrest discoloration.
Product	Brown background with white image lines and *free from thiosulfate* comprising an intermediate negative print.	White background with black or colored image lines and *permanently containing sufficient thiosulfate* to arrest discoloration of background comprising a finished positive print.

From the foregoing schedule, it is clear that the *Brown-Print Process produces only an intermediate negative with a brown background having white image lines and free from thiosulfate;* whereas the Diazotype Process involved

in the present suit produces a finished positive print with a white background having black or colored image lines and permanently containing sufficient thiosulfate to arrest discoloration of the background.

The trial Court justly and correctly recognized that the use of sodium thiosulfate in the Brown Print process was for a purpose entirely different than the purpose for which it is used according to the invention of the patents in suit. In the Memorandum Opinion, (R. 33) it is stated:

> "It is contended by defendant that the use of sodium thiosulfate was so well known in the blue printing and allied arts that any skilled workmen would naturally use it. True, it was used in the art, but for a different purpose. It was used as a solvent of chemicals insoluble in water in the blue print and sepia processes. If an artisan had used it, it would have been as a result of fumbling, and not with an understanding of its chemical function as a reducing agent. The prior art did not teach its use in this connection."

Effect of Patent Office Action.

The Officials of the Patent Office were duly notified of all known prior art due to the fact that the patentees made specific reference to prior patents in the specification of the Reducing Agent Patent. (Page 1, lines 39 to 79 of Patent No. 1,821,281.) With the prior art before them, the Patent Office Officials found that the quality of invention over the art cited by the inventors themselves and also found by the Patent Office Examiner was such as to render the invention patentable. This Action, on their part, creates a presumption of patentable novelty over the prior art which can be overcome only by clear proof that they were mistaken and that the combination lacks patentable novelty over the prior art. This is the well established rule as laid down in

Fairbanks v. *Stickney,* 123 Fed. 79, C. C. A. 8.

Canda v. *Michigan,* 124 Fed. 486, C. C. A. 6.

Coffin v. *Ogden,* 18 Wall. 120; 21 L. Ed. 821.

Kalle Patents.

The Defendant has referred to Kalle & Company's German Patent No. 526,370 (Exhibit "A" for identification; R. 126-128) and the corresponding U. S. Patent No. 1,803,906 (Exhibit "E"; R. 282-283). *At the outset, it should be noted that U. S. Patent No. 1,803,906 was stricken out on motion.* The aforesaid German Patent was filed in Germany on February 16th, 1928 (R. 283), and the corresponding U. S. Patent was filed in United States on February 6th, 1929. (Exhibit "E".) The Reducing Agent Patent No. 1,821,281 in suit was filed in Netherlands on December 11th, 1926, and in United States on June 6th, 1927 (Exhibit No. 1; R. 65). In other words, the Reducing Agent Patent in suit has an effective filing date practically three years earlier than the Kalle U. S. filing date and practically two years earlier than the Kalle German filing date. Of course, these Kalle U. S. and German Patents are too late and do not have any anticipatory or other effect on the Reducing Agent Patent in suit and have no proper place in the case. Kalle and Company, the owner of the German Patent No. 526,370 and corresponding U. S. Patent No. 1,803,906, is the same Kalle and Company which took a license under plaintiff Van der Grintens' foreign patents in nearly all countries of the world (R. 200). In view of the late dates of the Kalle patents and in view of the acknowledgment of the dominating position of plaintiff Van der Grintens' patents by Kalle due to their taking a license, it is clear that the German and U. S. Kalle patents are without any force or effect in the present suit.

Murray Patent.

The Defendant has referred to U. S. Patent No. 1,753,059 to Murray (Exhibit "B"; R. 66). As may be clearly seen from this Exhibit, Murray has a filing date in United States of September 14, 1929, and in Great Britain of July 14, 1928. The Reducing Agent Patent in suit as pointed out

hereinabove has a filing date in Netherlands of December 11th, 1926, and in United States of June 6, 1927. Of course, both of these filing dates are earlier than the Murray filing dates. In fact the effective filing date of the Reducing Agent Patent is practically three years earlier than Murray's U. S. filing date and practically two years earlier than Murray's British filing date. Under these circumstances, the Murray U. S. Patent No. 1,753,059 has no anticipatory or other effect on the Reducing Agent Patent in suit and has no proper place in the case.

DEFENDANT-APPELLEE'S EX PARTE TESTS NOT CONDUCTED IN ACCORDANCE WITH CHARLES BRUNING COMPANY'S DIRECTIONS ARE UNWORTHY OF CONSIDERATION.

Defendant-appellee has attempted to show by ex parte tests that with the Bruning Company sensitized paper and developer it was not possible to produce finished diazotype prints in which the discoloration of the white background was arrested for extended periods (R. 419-421). Upon cross-examination Mr. Duncan, defendant's witness, admitted that the two prints made with the Bruning Company paper and developer, Defendant's Exhibit K (R. 421) and Defendant's Exhibit L (R. 421), were washed with water after development and then dried, and that the directions accompanying the Bruning Company paper and developer explicitly exclude mention of washing the print with water after development (R. 424-425), because such washing removes the reducing agents which arrest the discoloration of the background.

Ex parte tests designed to show inoperativeness of a process or apparatus do not carry weight and are usually disregarded by the Courts. This is a reasonable rule with regard to inoperativeness of a patent because a patent is a government grant made after thorough examination by expert examiners of the Patent Office and because a patent

is presumed to be valid for an operative process or structure. Of course, persons making ex parte tests for a Defendant have no desire to make the process work, and, in fact, usually endeavor to show the process or device to be inoperative. Nevertheless, other persons more skilled, or even less skilled, might make the process or device operate with a sufficient degree of success to maintain the patent valid for an operative process or structure. In the present case, the numerous users of Bruning Company's sensitized paper and developer throughout the United States never had any difficulty. The increase in sales of Bruning Company from 127,000 square yards in 1929 to 975,000 square yards in 1933 prove the success and operativeness of Bruning Company's sensitized paper and developer and show that the ex parte tests of the defendant are unworthy of any serious consideration.

GERMAN PATENT OFFICE IS AN ADMINISTRATIVE BUREAU AND HAD ONLY A "PAPER" OPPOSITION BEFORE IT.

The Trial Court was under the erroneous impression that the German Patent Office had decided that *thiourea* as used on defendant-appellee's paper was not a reducing agent. As a matter of fact, if reference is made to the translation of the Kalle file wrapper (defendant's Exhibit A) relating to the Opposition (R. 122), it will be observed that the decision of the German Patent Office dated February 26, 1931, does not contain a single word to this effect. As a matter of fact, the German Patent Office did not have defendant-appellee's diazotype paper before it nor the question of whether thiourea as used in the sensitive layer of the defendant's paper was a reducing agent. The decision in the Kalle file wrapper clearly shows that the defendant-appellee or the Company from whom it buys its paper in Germany, Renker-Belipa, was not even a party to the opposition proceedings in the German Patent Office. As

the defendant-appellee was not before the German Patent Office and as the defendant's paper containing thiourea was not involved in the German opposition proceedings, how could the German Patent Office possibly decide whether thiourea as used in the defendant-appellee's paper was a reducing agent? Accordingly, the German Patent Office opposition papers and the decision of February 26, 1931, of the German Patent Office do not support the holding of the Trial Court.

For convenience, the portion of the memorandum opinion containing the reference to the ruling of the German Patent Office is quoted as follows (R. 33):

> "I find that thiourea as used in the light sensitive layer on defendant's paper is not a reducing agent, although it does arrest discoloration. This was the view taken by the German Patent Office in ruling on the opposition by the Van der Grintens to the first Kalle patent."

It is believed that the holding of the Trial Court that thiourea is not a reducing agent was predicated in part on the erroneous belief that the German Patent Office had ruled that thiourea is not a reducing agent. If reference is made to the decision of the German Patent Office appearing on pages 46 to 49 of the Kalle file wrapper, it will be observed that there does not appear a single ruling to this effect. Thus, on page 46, reference is made in the decision of the German Patent Office to "illegal acquisition of the invention"; on page 47, reference is made to "prior use"; and on pages 47, 48 and 49 reference is made to Van der Grintens' French Patent Specification 633,319" and "German Application C 39,700" and a discussion thereof. In that portion of the opposition dealing with "illegal acquisition" nothing is mentioned about thiourea or thiocarbamide. In the second section of the decision dealing with "prior use" the decision makes reference to the fact of Van der Grintens' paper being put in the trade in Germany. The German

Patent Office ruled that it believed nobody would have been induced to test the Van der Grinten paper put in the trade for thiocarbamide and similar sulphur-containing compounds. In the third section of the decision the first reference to thiocarbamide is that it cannot be considered as a *simple* "aliphatic amino compound" but no ruling was made that thiocarbamide was not a reducing agent. The German Patent Office then discusses the French patent and disclosure thereof. It is important to note that they make reference to the fact that thiocarbamide was referred to in Moureu's antioxygenes which is mentioned in the French patent. The following quotation is taken from the German Patent Office decision:

> "There it is stated that only 'des quantities excessivement faibles' of these substances, amongst which Moureu also mentions thiocarbamide, * * *"

On the next page, the German Patent Office admits that thiocarbamide is referred to in the French Patent, but that Kalle uses several times the amount mentioned. In other words, the German Patent Office ruled that in Germany Kalle was entitled to a patent for thiocarbamide even though the French patent made reference to thiocarbamide because Kalle was using greater quantities of thiocarbamide. For convenience, that portion of the ruling of the German Patent Office on page 49 is quoted as follows:

> "As against these quite extremely small quantities many times the quantity of thiocarbamide, calculated on diazo compound, is added according to the Examples 1 and 2 of the present application and about one and one-half times the quantity according to Example 3 of the present application."

Of course, this ruling may be correct in Germany but in United States the mere use of a larger quantity of a substance which is disclosed in a prior patent is "not invention". This is particularly true in the opposition because

Kalle merely used one and one-half times the quantity of thiocarbamide which was disclosed by the French patent. This ruling appears curious and great doubt is created on the subject as any chemist would have known about using a larger amount, particularly in view of Van der Grintens' prior French patent wherein a complete discussion is given of arresting the discoloration in the background of a diazo print by the use of reducing agents.

It is quite possible that the second paragraph occurring on page 49 of the German Patent Office decision was the one which gave the Trial Court an erroneous view. In this second paragraph the German Patent Office stated that:

> "* * * thiocarbamide here is not used together with reducing media".

Of course, this statement cannot be taken to mean that the German Patent Office ruled that thiocarbamide is not a reducing agent. What the German Patent Office was referring to was that thiocarbamide could act as (1) an antioxygene of Moureu and (2) that it could act as a reducing agent. In the instance in question the German Patent Office said that thiocarbamide was not used by Kalle with *another* "reducing media". In short, that thiocarbamide was used by itself and not in conjunction with *another* reducing agent. Instead of supporting the Trial Court holding, this ruling of the German Patent Office demonstrates that the holding of the Trial Court was erroneous. For convenience, the German Patent Office decision of February 26, 1931, is printed as part of the appendix of this Brief.

Further doubt on the propriety of the ruling of the German Patent Office is shown by the fact that Van der Grinten sent to Kalle and Company *in 1927 a sample roll of Van der Grintens' new diazo paper containing thiocarbamide or thiourea* in the sensitive layer thereof which was included for the purpose of preventing the yellowing of the backgrounds of prints made thereon (see page 12 of Kalle

file wrapper). Practically one year after the receipt of this sample roll, Kalle filed its application in Germany in 1928. Of course, it is clear that if there is a public use more than one year or prior to the time another makes his invention and files his patent application, it appears to be improper to grant a patent thereon. It is to be noted that the only explanation the German Patent Office had in its decision was that:

> "* * * nobody would have been induced to test the papers for thiocarbamide and similar sulphur-containing compounds. * * *"

Certainly it would not change the fact that Van der Grintens' paper had been in public use if Kalle had analyzed the paper or had not analyzed the paper. An inventor is charged with full knowledge of the prior art. Under these circumstances, it would almost seem that the German Patent Office is adhering to the apparent policy of Germany of discriminating against foreigners and in ruling in favor of Germans. In this connection, of course, it is to be borne in mind that Kalle & Co. is one of the large chemical companies in Germany and is a member of the great German Dye Trust, known as the "I. G.". It is debatable whether small inventors like the Van der Grintens who are Dutch and reside in Netherlands would have much chance in Germany against a powerful and influential organization like Kalle & Co. As a matter of fact, Kalle & Company had two of their chemists file a paper entitled "Declaration in Lieu of Oath", which may be read in full on page 26 of the Kalle file wrapper. In the body of the Declaration the chemist specifically takes the precaution and uses the words (italics ours) *"hereby declare in lieu of Oath"*. Certainly a document of this sort could not carry much weight before one of our Courts or before a judicial body. However, the German Patent Office is merely an administrative bureau which had a "paper" opposition proceeding before it. No testimony was taken, no wit-

nesses were sworn under oath and no evidence was received, but the entire proceeding was a "paper" one. Of course, the decision of an administrative bureau like the German Patent Office should not carry any weight at all, even assuming that it ruled that thiocarbamide was not a reducing agent as the Trial Court erroneously thought it did.

The possibility that the German Patent Office has discriminated against the Van der Grintens is suggested by the fact that they refused to grant a patent on the Van der Grinten invention (R. 118). In contrast to Germany it should be observed that practically all of the important countries of the world (R. 200) including twenty-two countries, Letters Patent were granted to the Van der Grintens for their discovery. As a matter of fact, the invention involved in the reducing agent patent in suit has been declared by the Trial Court to be a *"pioneer invention"*. Under these circumstances, it is clear that the German Patent Office is discriminating against the Van der Grintens.

In connection with the Van der Grintens' German application referred to in the opposition, it is to be noted that the Van der Grintens sold this application (R. 118). It so happens that the Van der Grintens sold their application to Renker-Belipa. This is the very same Renker-Belipa which the defendant-appellee is relying upon. Thus, Mr. Post, the President of the defendant-appellee produced a letter from Renker-Belipa and testified (R. 430 and 431) that the defendant-appellee was purchasing its diazo paper containing thiourea or thiocarbamide from Renker-Belipa. Renker-Belipa attempts to cover "its face" by claiming under a permit from Kalle under Kalle's patents (defendant's Exhibit N, R. 431). As Renker-Belipa has purchased the Van der Grintens' German application, it is clear that Renker-Belipa has paid tribute to the Van der Grintens and has recognized their invention in diazo print paper *containing thiourea or thiocarbamide as a reducing*

agent for arresting discoloration in the background. By paying this tribute to the Van der Grintens, Renker-Belipa has recognized and acknowledged the priority and the validity of the Van der Grintens' invention. As the defendant-appellee has purchased its diazo print paper from Renker-Belipa and as it is claiming under Renker-Belipa, it is clear that the defendant-appellee is in the same position as Renker-Belipa and that the defendant-appellee implicitly has recognized and acknowledged the validity and priority of the Van der Grintens' invention.

In passing, it should be noted that Kalle, the owner of the German application, against which the Van der Grintens filed an opposition in the German Patent Office, is the same Kalle who took a license in nearly all of the countries of the world under the Van der Grinten patents (R. 200). In view of the taking of this license by Kalle, it is clear that Kalle acknowledges and recognizes the validity and the priority of the Van der Grintens' inventions. The taking of a license under the Van der Grintens' patents in nearly all countries of the world by Kalle & Company should carry greater weight than any other ruling which the German Patent Office might have made and *demonstrates beyond a shadow of a doubt that thiourea or thiocarbamide is within the Van der Grinten patents and is a reducing agent.*

THE LOEVENICH DEPOSITION REPRESENTS SPECULATION AND CONJECTURE AND IS DEVOID OF COGENT PROOF.

The Trial Court stated that Dr. Loevenich's Deposition goes to the heart of the question. In view of the fact that the decision of the District Court is predicated on the Loevenich's Deposition, it appears appropriate to analyze the Deposition and to point out the deficiencies thereof and to make it clear that Loevenich's conclusions are mere speculation and conjecture and are unworthy of forming the basis of a judicial holding.

At the outset, it is to be observed that Loevenich, by his own statements, admits that he only acquired knowledge of thiourea, thiosulphate, and other reducing agents which are employed for arresting the discoloration of the background of diazo prints after February 10th, 1927, the date of the Van der Grinten Dutch Patent applications (R. 357 and 358). Loevenich testifies that it was not until 1929 that he occupied himself with the manufacture of diazotypes. In other words, it was more than two years after the Van der Grintens had given their invention to the world and had sent their diazo copying paper and developer to Germany for public use and sale that Loevenich gained any knowledge regarding the art. Surely, a witness of this sort is no expert at all and is not qualified to testify in matters of a complex and practical art like that of diazotypes. This is particularly true in view of the fact that Loevenich does not manufacture diazo print paper nor is he engaged in a factory manufacturing diazo print paper. As Loevenich has never had any practical experience in the diazotype art or in the handling of diazotype print paper or in the application of diazo compounds and reducing agents to sensitive layers of such paper or to the developers for diazo paper, how can Loevenich possibly be qualified to testify as an expert? The Deposition makes it clear that Loevenich has had no training or experience at all in the diazo print art prior to 1927. The only qualification he gives for the period prior to 1927 is in his opening statement (R. 350) in which he said that he "was steadily reading lectures on organic dyestuffs". For the convenience of the Court, Loevenich stated that:

> "I was steadily reading lectures on organic dyestuffs as well as courses in practical chemistry for students."

It is manifest that this is no qualification at all in the diazo print art. As a matter of fact, it is very doubtful whether "*reading lectures*" will qualify any witness to act as an

expert. Since 1929 Loevenich testifies that in addition to teaching at the University of Cologne, he is also a "scientific and technical adviser" for a large firm which manufactures diazo print paper. Loevenich makes no statement as to what he does as adviser, as to whether he has manufactured diazo print paper, as to whether he manufactured materials for the sensitive layer, as to whether he manufactured developers for diazo prints, as to whether he conducted actual experiments on diazo print paper in a practical way, and as to whether he did any experimental or research work on diazo print paper, chemical compounds used therein, or chemical developers therefor. The Deposition is barren of any foundation which would qualify Loevenich as an expert. As a matter of fact, Loevenich could not even qualify as "a man skilled in the art" or even as a practical artisan or skilled worker in the diazo print art. Under these circumstances, it is clear that the statements made by Loevenich are practically worthless and do not carry sufficient weight to support a holding upon which a judicial degree is based.

Not a single mention is made in the Loevenich deposition of any tests with diazo print paper which proves that thiourea forms an addition compound with a certain chemical present in the background of the finished print and that this compound discolors less easily and is more resistant to oxidation than the substance before reacting with thiourea. For convenience, the quotation is made from the Memorandum Opinion (R. 32):

> "Dr. Loevenich's deposition goes to the heart of this question. He testifies that thiourea forms an addition compound with a certain chemical present in the background of the finished print and that this compound discolors less easily and is more resistant to oxidation than the substance before reacting with thiourea."

In view of the fact that the opinion states that "Dr. Loevenich's deposition goes to the heart of this question", it

will be advisable to carefully read the Loevenich's deposition and analyze the statements made therein. A reading and analysis of the statements made by Loevenich will show, beyond a shadow of a doubt, that he never conducted any actual experiments with diazo print paper which proved that (1) thiourea forms an addition compound with a certain chemical present in the background of the finished print and (2) that this compound discolors less easily and (3) is more resistant to oxidation than the substance before reacting with thiourea. As a matter of fact, Loevenich never isolated his hypothetical "addition compound" about which he spins his speculating yarns. If the Loevenich deposition is analyzed, it will be found that the only tests Loevenich concerned himself with were TEST TUBE TESTS. Thus, in answer to question X 8, Loevenich states that "I have made the following test in a TEST TUBE" (R. 357). Then again, in answer to question X3, Loevenich again states that "the following test which can be made in a TEST TUBE" (R. 379). Then again, in answer to interrogatory No. 19, he again states "that this, my opinion, is correct, is evident from the tests which can be made in a TEST TUBE" (R. 390). Certainly, the entire Loevenich deposition makes it clear that the only basis for his statements and his opinion is TEST TUBE TESTS. Accordingly, how can it possibly be said that statements or opinions, or deductions or conclusions which are based on TEST TUBE TESTS can go to the "heart of this question" as mentioned by the Trial Court and how can it be said that such TEST TUBE TESTS can justify the Loevenich testimony that "thiourea forms an addition compound with a certain chemical present in the background of the finished print and that this compound discolors less easily and is more resistant to oxidation than the substance before reacting with thiourea" (R. 32)?

Loevenich's TEST TUBE TESTS are inconsistent with each other and do not support the conclusions and deduc-

tions which have been made therefrom. Thus (R. 356), Loevenich states that:

> "* * * p-Oxydiphenylamin oxidizes under influence of air or light partially to Quinonmonoanil, which is yellow to brownish in a thin layer and as a substance is of a red color."

In other words, this is based on another TEST TUBE TEST. Loevenich contends that the compound p-Oxydiphenylamin is oxidized under the influence of air or light to Quinonmonoanil which has a yellowish to brownish color in a thin layer and which has a red color as a substance. Loevenich makes the second test in a test tube (R. 357) except that hydrogen peroxide is the oxidizing agent instead of air. In this case, Loevenich obtains a solution which "is colored dark green and the undissolved p-Oxydiphenylamin turns black." For convenience, Loevenich's statement (R. 357) is as follows:

> "I have made the following test in a test tube. I have added to an aqueous hydrochloric suspension of p-Oxydiphenylamin, a solution of hydrogen peroxide, whereby the solution is colored dark green, and the undissolved p-Oxydiphenylamin turns black."

It will be observed that in the first case, Loevenich oxidizes p-Oxydiphenylamin and obtains a substance of *red* color which is *yellow* to *brownish* in a thin layer, whereas in the second test on the same substance, p-Oxydiphenylamin, he obtains a *dark green* solution with undissolved p-Oxydiphenylamin which turns *black.* In short, he obtains products with a *red* color in one case and products with a *green* or *black* color in another case. How can any sound deductions or conclusions be based upon such a wide discrepancy? Certainly, if the first test is an oxidation and reduction reaction producing a *red* colored substance, then the second test producing a *green* colored solution can not possibly be an oxidation and reduction reaction, or *vice*

versa. It will be observed that it is upon this second test which Loevenich adds thiourea to the solution prior to the addition of hydrogen peroxide. When Loevenich adds thiourea, he claims that he does not obtain the green color. From these facts, he then jumps to the conclusion that thiourea cannot be a reducing agent. *No chemical proof whatsoever has been given for this conclusion and, as a matter of fact, it does not even follow as a matter of simple reasoning or logic.* It will be observed that in all these TEST TUBE TESTS, Loevenich does not isolate any of the products and analyze them and prove their constitution and prove what reaction has occurred. He gives the formula of quinonmonoanil (R. 356) but no where does he state or show that he isolated this compound, analyzed it and determined its formula. The same remark applies to his second test and his third test. No statements are made showing isolation of intermediate or final products and their analysis and determination of their constitution. As a matter of fact Loevenich does not state the products which he obtains when thiourea is added to the solution and then hydrogen peroxide is added. He merely states that neither the green coloration nor blackening took place. Of course, the solution may have produced a red colored substance as in his first test, or may have produced a yellowish substance, a brownish substance, or some other kind of substance. If this is not the case, why does Loevenich conceal what actually did take place and why does not Loevenich specifically state the products produced in his third test, how he isolated them, how he analyzed them, how he determined their constitution, and how he proved that *"thiourea cannot be a reducing agent"?* These same remarks apply to Loevenich's statements in answer to question X3 (R. 377 to 379).

In passing, it should be noted that Loevenich's TEST TUBE TESTS are not equivalent to conducting tests with diazotype prints and ascertaining how thiourea acts with

the chemicals in the background of this print. Furthermore, the TEST TUBE TESTS are not subject to the same conditions as a diazo print is. Thus, a TEST TUBE TEST is conducted in an elongated glass test tube which excludes the light by absorbing it or a portion of it and only permits air to come in contact with the small exposed surface on the top of the high column of liquid or solution. On the other hand, diazo prints have a large extended surface freely exposed to the light and the air of the atmosphere. Then again, Loevenich's TEST TUBE TESTS are conducted in the *liquid phase* whereas diazo prints are in the *solid phase.* Loevenich's TEST TUBE TESTS, therefore, *have no resemblance to or similarity with conditions surrounding diazo prints.* Even assuming that Loevenich's TEST TUBE TESTS were conducted properly, they would not apply to diazo prints and conclusions which are based upon Loevenich's TEST TUBE TESTS could not be applied to diazo prints. In view of the foregoing it is manifest that the Loevenich's deposition could not go to the heart of the question and cannot form the basis of the statements found in the Memorandum Opinion (R. 32), and, therefore, do not furnish any support to the holding of the Trial Court.

The unreliability of the Loevenich deposition is clearly demonstrated by his statements, especially his answer to Interrogatory No. 9 (R. 359). In this answer, Loevenich states:

> "* * * that on the other hand *real reducing agents cannot prevent the discoloration of the paper.*" (Italics ours.)

This statement is contrary to statements by Loevenich in other parts of his deposition. Thus, in answer to X7 (R. 403) Loevenich states that *"thiosulfate is a reducing agent"*. In answer to Interrogatory No. 19 (R. 388), Loevenich states that *thiourea prevents discoloration and that the same action can be obtained by adding the reducing*

agent sodium thiosulphate. For convenience, the quotation (R. 388 and 389) is as follows:

> *"Yes, Thiourea prevents discoloration. * * * It is known that the same action can be obtained by adding the reducing agent Sodium Thiosulphate* to the developer liquid used for the light-exposed diazotype paper. (I mention here only *Thiosulphate as a reducing agent* because all other reducing agents are practically useless when added to the light sensitive layer or the developer. Furthermore, in cases where they are usable, their action in the retarding of the yellowing of developed diazo prints is much inferior to that of both of the above-mentioned ingredients *Thiourea,* Sodium *Thiosulphate.*)" (Italics ours.)

Surely, this inconsistency on the part of Loevenich and even a contradiction of himself will completely discredit the Loevenich deposition.

In this connection, it is also important to note that the thiourea, about which the Loevenich deposition is concerned, is the same thiourea which is referred to in the Kalle U. S. Patent No. 1,803,906 and the corresponding German Patent No. 526,370. As pointed out elsewhere, in this Brief, Kalle has taken a license under the Van der Grintens' patents nearly all over the world (R. 200). If thiourea were not an equivalent reducing agent to thiosulphate and were not within the Van der Grintens' patents, why would a great Company like Kalle and Company take a license? The answer is very simple:—because the Van der Grinten patents have been recognized as pioneer patents and *Kalle & Company knew that thiourea was a reducing agent and was within the scope of the Van der Grinten patents.*

In view of the foregoing facts the entire Loevenich deposition which is concerned with thiourea is without any weight at all and should not be considered.

KALLE FOREIGN LICENSE UNDER PLAINTIFF-APPELLANT VAN DER GRINTENS' PATENTS ACKNOWLEDGES PRIORITY AND PATENTABILITY THEREOF.

Kalle and Company, owner of British patent No. 210,862 (Plaintiffs' Exhibit No. 20, R. 116), has taken a license under the Van der Grinten foreign patents in nearly all countries of the world (R. 200). This same Kalle is the owner of the Kogel U. S. patent No. 1,444,469, Defendant's Exhibit C (R. 66), which defendant has urged as an anticipation against the claims of both patents in suit and has admitted by stipulation (R. 328) is a duplicate of the aforesaid British patent. Thus, Kalle and Company, the principal party who might most fairly claim the rights under the Van der Grinten patents, has taken a license thereunder. This, in itself, shows that the inventions of the patents in suit are patentable, as stated by the Supreme Court of the United States in *Tilghman* v. *Proctor,* 102 U. S. 707, wherein at page 713 the Court states:

> "We are satisfied that Tilghman was the original discoverer of this process. His priority was acknowledged at the time by those most interested to question it. Mr. Wilson to whose statement reference has been made, and who is perhaps more justly entitled than anyone else to claim an anticipation of Tilghman's discovery, makes no such pretension but, on the contrary, concedes Tilghman's right to priority; and, *indeed, Price's Patent Candle Company, of which Mr. Wilson was a member and director, took a license under Tilghman's English patent.*" (Italics ours.)

In view of the foregoing it is clear that the Kalle U. S. Patent No. 1,803,906 and the corresponding German patent No. 526,370, which have been much stressed by the defense as militating against the invention of the Reducing Agent Patent in suit, do not carry any weight as Kalle paid tribute to the Van der Grintens by taking a license (R. 200). Defen-

dant-appellee's deposition witness, Dr. Loevenich, concedes (R. 358-359) that everything, other than the Kalle patents including Danish patent for tartaric and citric acids to prevent premature coupling of the diazo compound and the azo dyestuff coupling compound in the sensitive layer, has been taught to him by the patents and applications of the Van der Grintens. It is to be noted that thiourea is disclosed in Kalle U. S. patent No. 1,803,906 and German patent No. 526,370 and that thiourea is the basis of the opposition in the German Patent Office and is the basis of the Loevenich Deposition upon which the Trial Court predicated its decision in a large measure. Thus in the memorandum opinion, the Trial Court said "Dr. Loevenich's deposition goes to the heart of this question" (R. 32) and also said "I find that thiourea as used in the light sensitive layer on defendant's paper is not a reducing agent, although it does arrest discoloration. This was the view taken by the German Patent Office in ruling on the opposition by the Van der Grintens to the first Kalle patent" (R. 33). As Kalle has taken a license under Van der Grintens' foreign patents, Kalle acknowledges the priority and patentability of the Van der Grintens' invention. Therefore, the Loevenich Deposition and the German Patent Office ruling do not carry any weight and do not militate against the validity, patentability and scope of the Van der Grintens' patent. If Kalle admits and acknowledges by taking a license that its thiourea is dominated by the Van der Grintens' patents, certainly Loevenich and the German Patent Office must be bound by Kalle's action.

The defendant-appellee attempted to show that they had a license under the Van der Grintens' patents in United States by the testimony of Mr. Rudolph C. Post, president of the Dietrich Post Company (Defendant-Appellee) (R. 430). Mr. Post showed a letter, which was read into the record (R. 430-431). This letter was from Renker-Belipa of Duren (Germany) and stated that their paper containing thiourea was produced under a permit from Kalle.

As Kalle has acknowledged the Van der Grintens' patents by taking a license, Renker-Belipa who claim through Kalle are thus bound to acknowledge and recognize priority and patentability of the Van der Grintens' patents and that *thiourea* comes within them and is covered by the claims thereof. In view of the fact that the Defendant-Appellee is claiming through Renker-Belipa who in turn is claiming through Kalle who has taken a license under the Van der Grintens' Patents, *it is evident that defendant-appellee must of necessity be bound by Kalle's action and therefore must admit, acknowledge and recognize the validity, priority and patentability of the Van der Grintens' patents.* Of course, it was brought out that Kalle's license did not extend to United States but to foreign countries (R. 200) and, therefore, the defendant-appellee has no license. The Trial Court so held (R. 35 and 42).

THE REDUCING AGENT PATENT NO. 1,821,281 HAS BEEN HELD TO BE GOOD AND VALID AND TO COVER A PIONEER INVENTION.

The invention of the Reducing Agent Patent No. 1,821,281 made a very substantial advance in the art and met with immediate commercial success, and it was so determined by the District Court.

The invention involved in the Reducing Agent Patent in suit is a pioneer invention and has revolutionized the art of diazotypes. Although the first process for making positive diazotype prints was invented by Green in 1890, it was not until more than thirty years later, about 1924, that Kalle invented his process with the two components in the sensitive layer and development with ammonia fumes and endeavored to introduce such process commercially. This Kalle process did not meet with favor because of the discoloration of the white background of the finished print after it was made. This was the state of the art in 1927 when the inventions of the Van der Grintens for arresting

the discoloration of the background of diazotype prints came into being. These inventions, realizing so to say the finishing touch on these processes for which the public had been waiting, revolutionized the diazotype art and went into immediate commercial success in Europe and provided the public with a satisfactory and acceptable process and Diazotype Print. (R. 112-115.)

The Van der Grintens made application for the Reducing Agent Patent in the United States (R. 99-101; 111-112) and, while this application was pending, the Van der Grintens consummated a commercial arrangement with the plaintiff-appellant, Charles Bruning Company, Inc., as heretofore set forth. Upon consummation of such arrangement, the Bruning Company immediately proceeded with the development work incident to placing the inventions on the market, spent approximately $150,000 (R. 204). The marketing of a sensitized paper and developer for use in the making of positive diazotype prints by Bruning Company in United States in accordance with the inventions of the patents in suit began in the latter part of 1929 and within a short period of four years from 1929, the sales had increased from 127,000 square yards of sensitized paper and 2,300 cans of developer in 1929, to 975,000 square yards of paper and 23,000 cans of developer in 1933, or approximately One Thousand (1000%) per cent in four years (R. 203-205). This immediate and marked success likewise revolutionized the diazotype art in the United States and created a new industry and the Van der Grintens' invention satisfied an outstanding want.

Where an invention produces a new industry, revolutionizes the art and goes into immediate commercial success, the quality of invention can not be denied.

Diamond Rubber Co. v. *Consolidated Rubber Tire Co.*, 220 U. S. 428; 55 L. Ed. 527.

Eibel Co. v. *Minnesota and Ontario Paper Co.*, 261 U. S. 45; 67 L. Ed. 523.

Wahl Clipper Corp. v. *Andis Clipper Co.,* 66 Fed. (2nd), 162 (C. C. A. 7).
O. K. Jelks & Son v. *Tom Huston Peanut Co.,* 52 Fed. (2nd), 4, 7 (C. C. A. 5).
Hughes Tool Co. v. *International Supply Co.,* 47 Fed. (2nd), 490 (C. C. A. 10).
Sherman Clay Co. v. *Searchlight Horn Co.,* 214 Fed. 86 (C. C. A. 9).
Permutit Co. v. *Harvey,* 279 Fed. 713 (C. C. A. 2).

Presumption of Validity.

With reference to the Reducing Agent Patent No. 1,821,-281, defendant-appellee has contended that the presumption of validity which ordinarily accompanies a patent that is issued in the United States is practically nullified by the failure of the Patent Office to cite prior art against any of the claims which were submitted. This is an error. *In fact, the application as filed lists and calls the attention of the art to a great number of prior publications and patents pertinent thereto, and so it would be absurd to say that the Patent Office overlooked citations of the prior art.* A list of these publications and patents are found on page 2 of the application as originally filed in the Patent Office, the file-wrapper of said patent which is in evidence as plaintiffs' Exhibit 3 and on page 1, lines 39 to 79, of the Reducing Agent Patent (Plaintiffs' Exhibit No. 1).

It is elementary that every Letters Patent for an invention carries a presumption of validity due to the fact that it is a grant of the Government of the United States. To show invalidity of a patent, the burden rests heavily upon a defendant. The rule is that a defendant to prove invalidity must do so not merely by a preponderance of evidence, *but by evidence beyond a reasonable doubt.* This rule has been established by a long line of decisions and was enunciated by this Court in *San Francisco Cornice Co.* v. *Beyrle,* 195 Fed. 516 (C. C. A. 9).

The Reducing Agent Patent Has Sufficient and Adequate Disclosure.

The Reducing Agent patent in suit describes several ways for carrying out the invention. Thus, this patent discloses the type of materials that will work successfully in arresting the discoloration of the background of the finished diazotype prints. These materials are defined broadly and are named in chemistry as reducing agents. The patent also discloses the preferred reducing agents and defines a number of classes, including aldehydes, amino compounds, aliphatic amido compounds and polyoxy-compounds. In addition, the patent contains seven specific examples for carrying out the invention, and in such examples defines certain specific reducing agents. The patent does not claim all reducing agents, but only those capable of doing a certain thing, namely arresting the discoloration of the background of the finished print.

A patentee does not have to disclose every conceivable means or substance which can be used in the carrying out of the invention defined by the claims. The patentees, the Van der Grinten brothers, have disclosed several ways all of which will carry out the inventions. All that the law requires is that the patent or patents disclose to those skilled in the art, at least one way or one means which can be used in carrying out the invention as defined by the claims, even though others may have to experiment to some extent with other materials to carry out the invention by the use of different materials other than those pointed out by the patentee. This is the law as laid down in *Standard Paint Co.* v. *Bird,* 175 Fed. 346, where at page 356 it is stated:

> "Clearly, it was not necessary to describe the whole process of making roofing of all colors, or to name all of the pitches or bitumens which exhibit a brownish color in thin layers, or to tell what was meant by a thin layer. It is enough that a patent so fully describes a

process or product that one reasonably skilled in the art may practice it or manufacture the product, and that others may know with reasonable certainty whether or not they are infringing the patent."

and on page 357 it states:

"It is true that the specifications do not attempt to enumerate those oils, fats, and resinous bodies that might be used, or those that should be used, or those that cannot be used; but I think such enumeration was unnecessary. In fact, it is quite probable that the inventors did not know all that might be used successfully or all that were unsuitable. Enumeration of specific substances would have incurred the danger of excluding those not enumerated and of opening the door to all comers who should use materials of the same class not specified. Thus an error in enumeration, if attempted, might have defeated or destroyed the value of the patent to the real inventor. This great particularity the law does not demand."

This same law is elaborately enunciated by this Court in the case of *Schumacher* v. *Buttonlath Mfg. Co.*, 292 Fed. 522, C. C. A. 9th, wherein at pages 534 and 535, it is stated:

"It is contended that no one can tell, except by independent experiment, how to conduct the claimed processes so as to have them successfully coordinate and cooperate together, to produce the useful result required by the statute. This scope of experimental requirement it is contended by the defendants is beyond the disclosures of the specification and claims, and render such disclosures insufficient.

"This objection has been brought to the attention of the appellate courts of the United States in a number of cases, particularly in Mowry v. Whitney, 14 Wall 620, 643, 20 L. Ed. 860; Carnegie Steel Co. v. Cambria Iron Co., 185 U. S. 403, 436, 437, 22 Sup. Ct. 698, 46 L. Ed. 968; Minerals Separation v. Hyde, 242 U. S. 261, 270, 37 Sup. Ct. 82, 61 L. Ed. 286; Minerals Separation v. Butte Min. Co., 250 U. S. 336, 341, 39 Sup. Ct. 496, 63 L. Ed. 1019; and Snow et al. v. Keller-Thomason Co. in this Court, 241 Fed. 119, 120, 154, C. C. A. 119.

"These cases involve processes in which something had been left by the specification and claims to the skill of persons applying the processes. In the last two Supreme Court cases, the process related to the concentration of ores by process of oil flotation. By reason of the varying character of the ores to be treated, preliminary tests were required by the user to determine the amount of oil and the extent of agitation necessary in order to obtain the best results from the different ores. Speaking of this feature of the process and the alleged uncertainty of the specification and claims as to the amount of oil to be used in the application of the invention, the court said:

> 'Untenable is the claim that the patent is invalid for the reason that the evidence shows that when different ores are treated preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results. Such variation of treatment must be within the scope of the claims, and the certainty which the law requires in patents is no greater than is reasonable, having regard to their subject matter. The composition of ores varies infinitely, each one presenting its special problem. and it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case. The process is one for dealing with a large class of substances and the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application, as the evidence abundantly shows. This satisfies the law.'

"To this last expression the Supreme Court added, in Diamond Rubber Co. v. Consol. Tire Co., 220 U. S. 428, 436, 31 Sup. Ct. 444, 448 (55 L. Ed. 527):

> ' * * * which only requires as a condition of its protection that the world be given something new and that the world be taught how to use it. It is no concern of the world whether the principle upon which the new construction acts be obvious or obscure, so that it inheres in the new construction.'

"The Supreme Court, in Loom Co. v. Higgins, 105 U. S. 580, 586 (26 L. Ed. 1177), referring to the judicial method of acquiring a knowledge of the elements of an invention and its relation to the prior art, said:

' * * * If we follow the specification in its description of the invention in detail, with the references to the drawings and the closing summary of the patentee's claims, the same method of interpretation will be applicable. And as it cannot be expected that the court will possess the requisite knowledge for this purpose, it becomes necessary that it should avail itself of the light furnished by the evidence to enable it to understand the terms used in the patent and the devices and operations described or alluded to therein. This evidence, of which the record in this case furnishes an abundance, being resorted to, we have no difficulty in comprehending the patent, or the nature of the invention therein described.'

"We have pursued that method in this case, to acquire the knowledge, if possible, of one skilled in the art, and while we have found the processes technical, and the elements closely compacted and delicately related, we have found no insuperable difficulty in comprehending the terms of the patent, its drawings, specification, and claims, and its disclosures of the processes therein described, and we draw the obvious conclusion that the expert, or one skilled in the art by experience, following such disclosures, would have no great difficulty in making, constructing, and using the process and the mechanism devised for carrying it into operation."

The invention involved in the Reducing Agent Patent is set forth and described in such full and clear terms that any one skilled in the art can carry the invention into practice. Thus, the invention is concisely stated in lines 55 to 61 of page 2 of the Reducing Agent Patent (Plaintiff's Exhibit No. 1). For convenience these lines read as follows:

"The invention is based on the observation that the discoloration of the background in all kinds of diazo-

type processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer, or during or after development of the picture."

The Van der Grintens clearly set forth in the aforesaid quoted lines their new teachings to the art. In essence, the Van der Grintens disclose that *"the discoloration of the background of all kinds of diazotype processes can be prevented * * * if a reducing agent is added to the sensitive layer, or during or after development of the picture."* There is a clear-cut instruction to those skilled in the art to add *"a reducing agent"* to the sensitive layer. Every chemist knows what a "reducing agent" is. In fact, a reducing agent is so well known that even a high school or college student in chemistry knows what it is. There is no difficulty in selecting reducing agents as these are well known substances in chemistry and are used in numerous arts. The Van der Grintens' process is so universal and simple that the reducing agent can be (1) added to the sensitive layer, (2) can be added during the development of the picture, or (3) can be added after the development of the picture. By following the simple teachings of the Van der Grintens of adding a "reducing agent" to the sensitive layer, the discoloration of the background of a diazotype print can be arrested. In view of the success which results from following the Van der Grintens' teachings and in view of the success of the Bruning Company and their customers in using the Van der Grintens' process and product, there cannot be the slightest doubt of the validity of the Reducing Agent Patent.

INFRINGEMENT OF THE PIONEER REDUCING AGENT PATENT NO. 1,821,281 WHICH HAS BEEN HELD TO BE ENTITLED TO A LIBERAL INTERPRETATION HAS BEEN ESTABLISHED BEYOND A SHADOW OF DOUBT.

It was proved by the plaintiffs-appellants' witness Klein (Plaintiffs' Exhibits 27 and 29; R. 207-217) that defendant-appellee's copying paper contained the following substances in the sensitized layer:

1. *Thiourea*
2. Diazo compound

Due to a stipulation (R. 203), defendant-appellee admitted that its paper called "Diepo Direcprint paper No. 500" contained a diazo compound bleaching on exposure to light.

Plaintiffs-appellants have likewise proved that the defendant-appellee's developer (Plaintiff's Exhibits 28 and 32; R. 208, 229-232) contained sodium thiosulphate. Due to a stipulation (R. 203), defendant-appellee admitted that its developer used in conjunction with its Diepo Direcprint paper contained an azo dyestuff coupling component and a non-volatile alkaline substance. In other words, the defendant-appellee's developer contained the following substances:

1. *Thiosulfate.*
2. Azo dyestuff coupling component
3. A non-volatile alkaline substance

The presence of these substances in the defendant-appellee's products was not controverted.

The claims charged to be infringed in the Reducing Agent Patent No. 1,821,281 are numbers 1, 3, 4, 7, 8, 16, 25, 40 and 41. The District Court held claims 1 and 25 were infringed and that claims 3, 4, 7, 8, 16, 40 and 41 were valid but not infringed.

For convenience process claim 1 reads as follows:

> 1. The process of rendering the background of the diazotype prints substantially stable against discoloration which comprises including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints.

Claims 3 and 4 are similar to claim 1 except that they are concerned with a "reducing aliphatic compound" and a "reducing amino compound," respectively.

Claim 7 is directed to a process and reads as follows:

> 7. The process for making diazotype prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component.

Claim 8 is a sub claim based on claim 7 and particularly specifies "an amino compound".

Claim 16 is another process claim which reads as follows:

> 16. The process for making diazotype prints which comprises applying to a base a layer containing a diazo compound bleaching on exposure to light and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said print, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component and a reducing agent capable or arresting under normal conditions the discoloration of the components forming the background of said prints.

The product involved is covered by claim 40 which reads as follows:

> 40. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon

exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

Claim 41 is a sub claim based on claim 40 and specifically calls for "an amino compound".

The *thiosulfate* used by the defendant-appellee was held to be "an inorganic reducing agent" (R. 33) and that it was a "reducing agent tending to arrest discoloration" and accordingly "claims 1 and 25 of said first patent are infringed" (R. 34).

Defendant-appellee's witness Loevenich admitted that *thiosulfate* was a reducing agent (R. 403) and that *thiosulfate* in the white background of a diazotype print arrested the discoloration of the background (R. 411).

Plaintiffs-appellants' witness Van der Grinten testified that *thiosulfate* was a reducing agent (R. 96) and that *thiosulfate* when present in the background of a diazo print arrested discoloration of such a background (R. 98). This was corroborated by Klein (R. 231).

The *thiosulfate* used by defendant-appellee contains "*sulfur*" as shown by the analysis of plaintiffs-appellants' witness Klein (R. 229). The formula for sodium *thiosulfate* is $Na_2 S_2 O_3$ as admitted by defendant-appellee's witness Loevenich (R. 403), S denoting sulfur.

From the opinion of the Trial Court (R. 30), it will be noted that the basis of holding claims 1 and 25 infringed was that the defendant's developer contained *thiosulfate,* admittedly a reducing agent capable of arresting discoloration (R. 34). The background of the finished print after being developed, contained *thiosulfate,* a reducing agent capable of arresting discoloration of said background. The Court found, and the testimony establishes (R. 96; 98; 231-232; 402-404) that *thiosulfate* is a compound containing sulfur and is a reducing agent capable of arresting discoloration. The *thiosulfate* becomes a component of the background of

the print by its introduction to the background of the print through its presence in the developer by which the print is developed or fixed. On the other hand, *thiourea* was directly made a component part of the chemicals forming the sensitive layer of defendant's paper. Admittedly *thiourea* arrests discoloration of the background of the finished print as testified to by plaintiffs' witness (R. 98; 217-220), and defendant's witness (R. 388), and was so found by the Trial Court (R. 33).

The question is, therefore, whether thiourea is a reducing agent and whether it is a reducing amino compound or a reducing aliphatic compound; or, in view of the broad scope rightly attributed to patent No. 1,821,281, which has been held to be entitled to a liberal interpretation, *whether thiourea is the equivalent of the thiosulfate* held to be an infringement or of such a reducing agent or compound as to be within the scope of the patent or of claims 3, 4, 7, 8, 16, 40 and 41, or of infringed claim 1. Simmered down to one sentence, that is the one question on appeal to this Court. Plaintiffs-appellants contend that *thiourea* is such a reducing agent and that it is a *reducing amino compound* and also a *reducing aliphatic compound.* It is likewise contended that *thiourea* is the equivalent of the substances specified in the patent and of *thiosulfate* held to be an infringement and capable of accomplishing the same result, and that it comes within the doctrine of being "equally good."

Specimens of defendant-appellee's sensitized paper and developer charged to infringe are in evidence as follows:

> Plaintiffs' Exhibit 27, Specimen Piece of Defendant's Diepo Direcprint Paper.
>
> Plaintiffs' Exhibit 28, Specimen of Defandant's Developer.

Defendant-appellee furnishes to its customers for its Diepo Direcprint paper and developer directions for using

the paper and developer in accordance with the claims of patent 1,821,281, a specimen of such directions being in evidence as Plaintiffs' Exhibit 26, Directions for Using Defendant's Paper and Developer (R. 207).

Defendant-appellee has admitted (R. 247) that subsequent to notice of infringement, it has practiced the process wherein its Diepo Direcprint Paper No. 500 and its developer therefor have been used in accordance with the directions of Exhibit No. 26.

Defendant-appellee has admitted by stipulation (R. 203) that its sensitized paper contains a diazo compound bleaching on exposure to light, and that its developer contains an azo dyestuff coupling component and a non-volatile alkaline substance.

Mr. Klein, a qualified chemist, witness for plaintiffs-appellants made an analysis of defendant-appellee's paper to ascertain whether it contained a diazo compound bleaching on exposure to light and a reducing agent capable of arresting, under normal conditions, the discoloration of the components forming the background of the finished print. Because of the admission by stipulation (R. 203), it was necessary only to show the presence of a reducing agent aforesaid in the paper. This analysis is graphically shown on the chart in evidence as Plaintiff's Exhibit 29 and definitely established the presence of *thiourea* in the sensitive layer of such paper. Such analysis is not controverted by any evidence.

Mr. Klein likewise made an analysis of defendant-appellee's developer to determine if it contained an azo dyestuff coupling component, a non-volatile alkaline substance, and a reducing agent non-decomposable by alkali and capable of arresting, under normal conditions, the discoloration of the components forming the background of the finished print. Because of the admission by stipulation at R. 203 previously referred to, it was necessary only to demonstrate that the developer contained a reducing agent of the type aforesaid. This analysis is graphically shown on

the chart in evidence as plaintiffs' Exhibit 32, and definitely established the presence of *thiosulfate* in the developer. *This analysis is not controverted by any evidence.*

Mr. Klein testified (R. 236-237) that, upon using defendant-appellee's paper and developer in accordance with the directions accompanying such paper, Plaintiffs' Exhibit 26, a finished print is obtained which has a white background that will remain substantially white for extended periods under normal conditions of storage.

All that the description of the Reducing Agent Patent No. 1,821,281 and the claims thereof require to bring defendant-appellee's operations within these claims is that the evidence show that *thiosulfate*, present in defendant-appellee's developer, is a reducing agent and, in addition, acts to arrest the discoloration of the white background of the finished diazotype print when present therein; and that *thiourea,* present in defendant-appellee's sensitized paper, *is a reducing agent,* that it is both an *aliphatic* and an *amino compound,* and that it acts to arrest the discoloration.

The evidence shows that all witnesses agree that that *thiosulphate* is a reducing agent (R. 96; 231; 403), and that it acts to arrest the discoloration when present in the background of the finished print (R. 98; 231-232; 404). Likewise, all witnesses agree that *thiourea,* when present in the background of the finished print, acts to arrest discoloration (R. 98; 217-220; 388), and that *thiourea* and thiocarbamide are the same product (R. 95; 277; 366). Dr. Van der Grinten and defendant's experts, Doctors Loevenich and Lazar agree that *thiourea* is an aliphatic compound (R. 96; 375), and that it is also an amino compound (R. 97; 375, 322), and they agree that *thiourea* is a reducing agent within the definition of Mellor's Inorganic Chemistry (R. 89; 93; 341; 380).

In defining a reducing agent, Dr. Van der Grinten (R. 89) testified:

> "A reducing agent also is a substance which is capable of taking off chlorine out of cupric chloride; that

> is to say, reducing the non-metallic part of a metal salt and taking off the non-metallic part wholly or in part out of such compound."

In substantiation of this, he quoted from page 506 of Mellor's Inorganic Chemistry, which is in evidence as Plaintiffs' Exhibit 9, where a reducing agent is defined (second definition) as:

> "A reducing agent is a substance which can decrease the non-metallic part of a compound."

Defendant-appellee's expert, Dr. Lazar, admitted that a substance which can decrease the non-metallic part of a compound or which can remove oxygen from other substances is a reducing agent (R. 339). As this is the definition given by Mellor (Plaintiffs' Exhibit 9) and given by Dr. Van der Grinten (R. 89), it is clear that Dr. Lazar is in accord with the definition of "reducing agent".

In the deposition of defendant-appellee's expert, Dr. Loevenich, it is to be noted that he admitted that a reducing agent was a substance which can change the metal of a metal salt from the higher to the lower valence, as for example the cupr*ic* copper of a valence of two (2) to the cupr*ous* copper of a valence of one (1) (R. 380). *Consequently, defendant-appellee's two experts are in accord with Mellor and plaintiffs-appellants' expert, Dr. Van der Grinten, in regard to the definition of a reducing agent.*

The definition of a "reducing agent" as given by plaintiffs-appellants and as admitted by defendant-appellee is in accord with a definition of a "reducing agent" which has been adjudicated in the case of *Steinfur Patent Corporation* v. *J. Meyerson, Inc.,* 56 Fed. (2d) 372. In the Steinfur Case, the court held that:

> "A reducing agent is one that will lower the positive valence of an element or remove oxygen from a compound."

As defendant-appellee is in accord with plaintiffs-appellants' definition of a "reducing agent" and as this definition has been adjudicated, it will be applied to *thiourea* to ascertain whether *thiourea* is a reducing agent or not.

Concerning whether thiourea is a reducing agent, Dr. Van der Grinten testified that thiourea was capable of reducing cupr*ic* chloride in which the cupr*ic* copper had a valence of two (2) to cupr*ous* chloride in which the cupr*ous* copper has a valence of one (1), and that thiourea was capable of reducing cupr*ic* acetate to cupr*ous* acetate, because of tests he personally made with thiourea and cupr*ic* chloride on the one hand and with thiourea and cupr*ic* acetate on the other hand. In this connection Dr. Van der Grinten testified at R. 93-95:

> "I term thiourea a reducing agent because thiourea is capable of reducing the non-metallic part of a metal salt; for instance, it is capable of reducing cupr*ic* chloride, which consists of one atom of copper with two atoms of chloride, to cupr*ous* chloride, which consists of a molecule containing only one atom of copper and one atom of chlorine. * * * From this, it follows that thiourea mixed with cupr*ic* chloride strictly falls under the definition of a reducing agent under the definition of Mellor. *I have tried this same test several times and I always obtained the exact result which Rathke describes.* There may be seen some complication in this test because of the formation of the white precipitates in which the cupr*ous* chloride is in addition projected with thiourea. In order to avoid this complication I have made quite an analogous test in which another salt or copper was used, I namely used cupr*ic* acetate, which upon reduction to cupr*ous* acetate does not yield a white precipitate. In order to make sure that my original solution contained cupr*ic* acetate I employed a well known test on cupr*ic* salts in general, which consists of the addition of ammonia in excess to such solution. If to a cupr*ic* salt solution ammonia is added in excess a strong violet blue color is obtained. When I took my original cupr*ic* acetate solution and added to it *thiourea,* let it stand for some minutes, in order to give the

> thiourea an opportunity to react with the cupr*ic* acetate and then added ammonia, I found that no more blue color appeared, which indicated that no more cupr*ic* salt was present. *The cupric salt consequently was reduced by the thiourea.*" (Italics ours)

The Rathke article and translation thereof above referred to by Dr. Van der Grinten, is in evidence as Plaintiffs' Exhibit 10 (R. 95).

On cross-examination, this testimony with respect to the test involving thiourea and cupric acetate was not even controverted, and that with reference to the test involving thiourea and cupric chloride was not shaken (R. 129-132).

As to the action a substance must show to be a reducing agent, defendant's expert Dr. Loevenich, testified at R. 380:

> "X 4. Is it not a fact that a substance which can change the metal of a metal salt from the higher to the lower valence, as for example the cupric copper of a valence of two (2) to the cuprous copper of a valence of one (1), is a reducing agent?"
>
> Answer: "Yes".

Defendant-appellee's expert, Dr. Lazar, under cross-examination, testified that the formula CuCl in line 6 of the quoted paragraph of the Rathke article (Plaintiffs' Exhibit 10) appearing as a part of the answer by Dr. Van der Grinten relative to the tests with thiourea and cupr*ic* chloride and cupr*ic* acetate referred to above is that of cupr*ous* chloride (R. 337). Dr. Lazar, defendant's expert chemist, testified (R. 338) that it is a fact that the change of cupr*ic* chloride to cupr*ous* chloride involves a decrease of the non-metallic part. At R. 341, Dr. Lazar testified that CuCl (*i. e.* one atom of chlorine) was cupr*ous* chloride and that the formula of cupr*ic* chloride is $CuCl_2$ (*i. e.* two atoms of chlorine), and that if one of the atoms of the cupr*ic* chloride were given off and we got CuCl, that would be a decrease in the non-metallic part of this compound, if cupr*ous* chloride could be found but it cannot. In addition, Dr. Lazar

testified at R. 341 that if thiourea changed cupric chloride to cuprous chloride, then according to Mellor's own definition, thiourea would be a reducing agent. At R. 325, Dr. Lazar testified that Mellor is an authoritative work. In this connection, it will be noted from Dr. Van der Grinten's testimony (R. 94-95) that *Dr. Van der Grinten has made several actual tests with thiourea to demonstrate the truth of this chemical phenomena that thiourea acts as a reducing agent, not only with cupric chloride, but also with other copper salts, such as cupric acetate; whereas defendant's expert witness, Dr. Lazar, repeatedly testified that he made no tests of the many matters to which his testimony was directed* (R. 304, 306, 313, 329), *and specifically, he failed to show that he had made any tests to determine for himself the chemical reaction of thiourea with cupric chloride, though he is very ample with his testimony in this regard* (R. 341). However, he admits that $CuCl_2$ (cupric chloride) would be changed to CuCl (cuprous chloride) which is a decrease of the non-metallic part (chlorine) of the compound (cupric chloride); otherwise the Cl_2 would not be changed to Cl.

Referring to the test relating to the reduction of cupric chloride to cuprous chloride by means of *thiourea* to which the expert witnesses of both plaintiffs and defendant have testified, such test involves the transformation or conversion of cupric chloride to cuprous chloride which may be expressed graphically as $CuCl_2$ to CuCl. In the graphic formula the "Cu" is the symbol for one atom of copper, and "Cl" is the symbol for one atom of chlorine. The metal copper exists in two forms, the cupric copper having a valence of two (2), and the cuprous copper having a valence of one (1). "Valence" of an element is a number which expresses how many atoms of hydrogen or other atoms equivalent to hydrogen or chlorine can unite with one atom of the element in question. In this case for the element copper with a valence of two (2), it takes 2 atoms of chlorine to unite with one atom of cupric copper to form cupric chloride of

the formula $CuCl_2$. For the element copper with a valence of one (1), it takes 1 atom of chlorine to unite with one atom of cupr*ous* copper to form cupr*ous* chloride of the formula CuCl. Now, referring to the graphic expression $CuCl_2$ to CuCl, the change from $CuCl_2$ to CuCl may be plainly stated as the compound (cupr*ic* chloride) with "one atom copper and *two* atoms of chlorine" changed to the compound (cupr*ous* chloride) with "one atom of copper and *one* atom of chlorine". In other words, two atoms of chlorine are present in cupr*ic* chloride whereas only one atom of chlorine is present in cupr*ous* chloride. Similarly, the valence of copper is changed from two (2) in cupr*ic* copper to one (1) in cupr*ous* copper. It is clear that the chemical transformation or conversion of cupr*ic* chloride to cupr*ous* chloride involves a decrease of the non-metallic part [chlorine from two (2) to one (1)] of the compound, as stated by all witnesses, plaintiffs-appellants' and defendant-appellee's, and Mellor, or the lowering of the positive valence of an element [copper from two (2) to one (1)], as stated by the Steinfur decision. *In other words, when cupric chloride is changed to cuprous chloride a reduction has been effected and the substance which causes cupric chloride to change to cuprous chloride is a reducing agent.*

The testimony has demonstrated beyond a shadow of doubt that *thiourea* causes the transformation of cupr*ic* chloride to cupr*ous* chloride (R. 86-98, 336-341, 380-383). In other words, *thiourea* causes cupr*ic* copper with a valence of two (2) to be lowered to cupr*ous* copper with a valence of one (1) and *thiourea* causes the non-metallic part (chlorine) of the compound to decrease from two (2) atoms of chlorine in cupr*ic* chloride to one (1) atom of chlorine in cupr*ous* chloride. *Accordingly, thiourea is clearly and unequivocably a reducing agent within the foregoing definition agreed to by plaintiffs-appellants' witnesses and the great chemical authority, Mellor. Furthermore, thiourea is a reducing agent within the definition of the Steinfur Decision.*

For convenience, cross question 4 to defendant-appellee's expert witness, Dr. Loevenich and his answer thereto (R. 380) are quoted as follows:

> "X 4. Is it not a fact that a substance which can change the metal of a metal salt from the higher to the lower valence, as for example the cupric copper of a valence of two (2) to the cuprous copper of a valence of one (1), is a reducing agent?
> Answer. Yes."

Dr. Loevenich admits that a substance which is capable of changing cupr*ic* copper of a valence of two (2) to cupr*ous* copper of a valence of one (1) is a *reducing agent.* Defendant-appellee's second expert witness, Dr. Lazar, likewise made the same admission (R. 338) as is evident from the following quotation of a question and Dr. Lazar's answer:

> "Q. Is it not a fact that the change of cupric chloride to cuprous chloride involves a decrease of the nonmetallic part, in this case the chlorine, of the cupric chloride?
> "A. Yes, it does, if you consider the reaction cupric chloride to cuprous chloride in itself, that is, just by itself."

This statement is in accord with Mellor's definition as admitted by Dr. Lazar as shown by the following questions and answers (R. 339):

> "Q. Is it not a fact that a substance which can decrease the nonmetallic part of a compound is according to Mellor's definition on page 506 of Plaintiffs' Exhibit No. 9, and I call your attention to line 9 from the bottom of that page, 'is a reducing agent'?
> "A. Yes, I stated that before, that the sentence reads [268] 'A reducing agent is a substance which can remove oxygen from other substances.'"
> "Q. And will you read No. 2?
> "A. 'Can decrease the non-metallic part of a compound.'"

Defendant-appellee's expert witness, Dr. Loevenich, likewise makes the following admission on page 382 of the Transcript of Record:

> "X 15. If your answer to question X 11 is "IT DOES", does or does not the addition compound consist of thiocarbamide and cupric chloride of the formula CSN_2H_4, $CuCl_2$, or of thiocarbamide and cuprous chloride of the formula $CSN_2H_4.CuCl$?
>
> "ANSWER. In the literature only addition compounds of Thiourea and Cuprous Chloride of the Formula CSN_2H_4 CuCl are described."

In answer to a further question (R. 382 and 383), Dr. Loevenich admitted that when a solution of thiocarbamide of the formula CSN_2H_4 (thiourea) is mixed with a blue colored solution of cupr*ic* chloride of the formula $CuCl_2$, a white precipitate consisting of the addition compound of thiocarbamide (thiouera) and cupr*ous* chloride of formula $CSN_2H_4.CuCl$ is deposited and the color of the solution changes from blue to a colorless color. Dr. Loevenich went on to say that when an excess of cupr*ic* chloride is added so that there is not any more thiourea left to react with it, the blue color remains. Of course, this is self evident and is like saying that when a pail of water is emptied, it is impossible to obtain any more water from the empty pail. This does not change the fundamental proposition that *cupric chloride of formula $CuCl_2$ is reduced to cuprous chloride of formula CuCl by thiourea (thiocarbamide) which therefore acts as a reducing agent.* The foregoing is likewise clear from the admission of defendant-appellee's second expert witness, Dr. Lazar whose answers to the questions propounded are as follows (R. 337-338):

> "Q. Is it not a fact that this paragraph states the colorless liquid which is obtained apart from the compound of thiourea and cuprous chloride is a combination of one molecule of thiourea with one atom of chlorine.
>
> "A. Yes, it does.

"Q. Is it not a fact that this paragraph states that this chlorine with which the thiourea has combined, as in this case, has been given off of the cupric chloride.

"A. Yes, that is true. [267]

"Q. Is it not a fact that this paragraph states that by thus giving off of the chlorine the cupric chloride has been changed to cuprous chloride?

"A. Yes, it has, in the same sense that I stated before, that the cuprous chloride is not present in the compound, it is only given as a symbol."

From the foregoing, it is apparent that even Dr. Loevenich corroborates plaintiff-appellants' witness, Dr. Van der Grinten, by admitting (R. 382-383) that thiourea when brought together with cupr*ic* chloride, reduces the latter to cupr*ous* chloride which is thrown down in a white precipitate as an addition compound with residual thiourea. This clearly shows that Dr. Loevenich admits that *thiourea acts as a reducing agent and in a reducing manner.* Dr. Lazar defendant-appellee's other expert, (R. 337-338) makes the same admissions as Dr. Loevenich.

The Trial Court found (R. 42, Finding of Fact No. 23) that *thiosulfate* present in defendant's developer was a reducing agent and that it resists discoloration of the background for extended periods. It likewise found (R. 42, Finding of Fact No. 28) that *thiourea,* present in defendant's sensitized paper, resists discoloration, and that there are circumstances under which *thiourea* acts as a reducing agent. It was further found by the Trial Court that *thiourea "is not a reducing agent in connection with the chemicals present in the background of a positive diazotype print made with Defendant's paper* although *thiourea* does resist discoloration of the white background of a positive diazotype print * * *". It is important to note Finding of Fact No. 28, because it is substantially in the words of the original Memorandum Opinion (R. 32). For convenience, Finding No. 28 is here quoted:

"28. That it may be that there are circumstances in which thiourea acts as a reducing agent but thiourea

> as used in the light sensitive layer on defendant's paper, is not a reducing agent in connection with the chemicals present in the background of a positive diazotype print made with defendant's paper, although thiourea does resist discoloration of the white background of a positive diazotype print to an appreciable extent for extended periods of time when present in said background."

Although in Finding of Fact 26, the Trial Court finds that thiourea is used in the light sensitive layer of defendant's paper, and in Finding 28 finds that thiourea, under some circumstances, may be defined as a reducing agent, and that thiourea does resist discoloration of the white background of a positive diazotype print, it nevertheless decreed that claims 1, 3, 4, 7, 8, 16, 40 and 41 of The Reducing Agent Patent No. 1,821,281 *were not infringed by thiourea.*

This holding is apparently based principally upon four errors: firstly, the error of fact that the patentee has specified somewhere in the patent or claims that the reducing agent had to function or to act in the manner as a reducing agent in the background of the finished print; secondly, the error of fact that the Reducing Agent Patent is predicated upon a theory and states a theory of action of the manner in which the reducing agent acts with the chemicals present in the background of the finished print; thirdly, the error of law that a patentee, having stated a theory of operation, is bound by the theory and must prove that the invention defined by the claims operates according to that theory and, as a corollary, that in a process involving chemical reactions a patentee must prove how a chemical acts in the environment of other chemicals; and fourthly, the error of fact in finding that thiourea is not a reducing agent in connection with the chemicals present in the background of a positive diazotype print made with defendant's paper. In this connection, attention is respect-

fully invited to the following abstract taken from the Memorandum Opinion which states (R. 32):

> "Plaintiffs' *theory* of this invention is that the discoloration of the backgrounds is due to the oxidation resulting from exposure to the atmosphere, and that a reducing agent which remains colorless when oxidized counteracts the tendency of the chemicals in the background to themselves oxidize and darken. *Is thiourea such a reducing agent?* I do not believe that the evidence shows that it is. *It may be that there are circumstances in which thiourea acts as a reducing agent,* but *I do not believe that is important* if it does not do so when used in connection with the chemicals present in the background of diaz prints. Dr. Loevenich's deposition goes to the heart of this question. He testifies that thiourea forms an addition compound with a certain chemical present in the background of the finished print and that this compound discolors less easily and more resistant to oxidation than the substance before reacting with thiourea. He also tells of tests which show that thiourea is not subject to oxidation. I find that thiourea as used in the light sensitive layer on defendant's paper is not a reducing agent although it does arrest discoloration. This was the view taken by the German Patent Office in ruling on the opposition by the Van der Grintens to the first Kalle patent." (Italics ours.)

As to the error of fact, Dr. Van der Grinten's testimony discloses (R. 94-95; 98) that from his own tests thiourea is a reducing agent and arrests discoloration of the background of diazotype prints, and that according to the result obtained, the only plausible view of the mechanism involved when a substance with reducing characteristics counteracts an oxidation is that it acted as a reducing agent in the background of the print. Dr. Van der Grinten could not see with his eyes or ascertain definitely in any way how the chemicals reacted upon each other nor how the molecules or atoms reacted with each other nor what theoretical molecular or atomic processes were involved as a hypo-

thetical principle of chemistry. No other chemist can see or ascertain definitely how the chemicals react with each other or how the molecules or atoms react with each other or what the theoretical principle is. The Courts have long recognized that a patentee did not have to see or ascertain or know. This Court has enunciated this doctrine in the case of *Petroleum Rectifying Co.* v. *Reward Oil Co.*, 260 Fed. 177, in which it was stated that:

> " * * * it was not essential that they should either understand or set forth the principle on which their process operated."

The foregoing doctrine has been enunciated again and again and has been followed in a long line of decisions. The U. S. Supreme Court held in the case of *Diamond Rubber Co.* v. *Consolidated Rubber Tire Co.*, 220 U. S. 428 (435), that:

> "A patentee may be baldly empirical, seeing nothing beyond his experiments and the results, * * * It is no concern of the world whether the principle upon which the new construction acts be obvious or obscure so that it inheres in the new construction."

The Van der Grintens discovered that when they introduced into their process the step of including a chemical which accomplished those things which the authorities said a reducing agent would accomplish, they obtained the desired result of arresting discoloration in the background of a diazotype print. Accordingly, the Van der Grintens specified very carefully, fully and clearly the chemicals which produced the new results and named these chemicals by the name by which they are known in chemistry to wit: "*reducing agents*". This name is in accordance with the authorities. (See definition by Mellor and Steinfur decision, *supra.*) Dr. Van der Grinten's experiments disclosed (R. 98) *that when he introduced thiourea into the background it accomplished the new result of the Reducing Agent Patent of arresting discoloration; when he left*

it out the result was not accomplished. The Reducing Agent Patent in suit describes the Van der Grintens' invention in lines 55 to 61 of page 2 of the specification thereof as follows:

> "The invention is based on the observation that the discoloration of the background in all kinds of diazotype processes can be prevented even for extended periods if a reducing agent is added to the sensitive layer, or during or after development of the picture."

It will be observed that the foregoing specification is followed and the Van der Grintens' invention is practiced and enjoyed when a *reducing agent* is included in the background of the finished print. No theory of action is specified. No manner of action is specified. No requirement is made that the reducing agent act in any manner in connection with the chemicals present in the background of diazo prints nor that the substance as used in the light sensitive layer on the paper act in a reducing manner or as a reducing agent. The teaching of the Van der Grintens is that a substance named in chemistry as a reducing agent be included in the background of the print. If this is done, the Van der Grinten's new results will be obtained to wit:—the arresting of discoloration in the background of the print. The defendant-appellee follows the teaching of the Reducing Agent Patent in suit and obtains and enjoys the new results thereof. The defendant-appellee used *thiourea* which is known in chemistry as *a reducing agent* and included *thiourea* in the background of a diazo print in accordance with the teachings of the Reducing Agent Patent. The defendant-appellee practices the Van der Grintens' invention, appropriates the teachings in the Reducing Agent Patent and enjoys the new results with which the Van der Grintens provided the art. There never could have been a more complete trespass upon the property of another as that committed by defendant-appellee upon the patent property of plaintiffs-appellants.

In passing, it is to be noted that the only way it is humanly possible for a chemist or person to know how chemicals react is by the result. Dr. Van der Grinten subjected thiourea to recognized and authoritative tests and the results all showed that *thiourea is a reducing agent and has a reducing action.* Dr. Lazar (R. 273-274) and Dr. Loevenich (R. 376-379), boldly assert that thiourea does not act as a reducing agent in the chemical environment of the background of the print without any proof or concrete evidence. *They admit* that thiourea will reduce the non-metallic part of a compound (R. 341; 383); *they admit* that if a chemical will accomplish that result, it is a reducing agent (R. 338 and R. 380); *they admit* that both organic and inorganic compounds which accomplish that result are reducing agents and both types act in the same manner (R. 327), *they admit* that thiourea accomplishes the result of arresting discoloration in the background of the print (R. 388). In spite of these damaging and conclusive admissions, they attempt to spin a yarn and to tell what other things thiourea will do. Thus, they emphasize the fact that thiourea will form an addition compound with cupr*ous* chloride which is a white precipitate. On the base of this additional property of thiourea, they attempt to argue that it is not a reducing agent. (R. 336-337; 378). *Thiourea may have this additional property of forming an addition product with cuprous chloride, but that does not change the fundamental fact that thiourea is a reducing agent and acts as such as the testimony clearly proves.* Dr. Van der Grinten testified that thiourea reduces cupr*ic* chloride to cupr*ous* chloride and then residual or unused thiourea form an addition product with the reduced cupr*ous* chloride and that the addition product appears as a while precipitate. (R. 94.) All of this has been tacitly admitted by Dr. Loevenich and Dr. Lazar. It may do quite a number of things in addition to being a reducing agent which is capable of arresting the discoloration of the background of the print. The Reduc-

ing Agent Patent is not concerned with what other things thiourea does or is capable of doing. All the Reducing Agent Patent is concerned with is whether thiourea comes within the definition of a "reducing compound", and whether thiourea is capable of arresting discoloration of the background of diazo prints. Whether it *acts* as a reducing agent or *acts in a reducing manner,* in connection with chemicals present in the background of diazo prints makes no difference. To require a patentee either to state in his patent or to prove at a trial how chemicals *act,* except by stating the names of the agents and how such agents are to be used and the results of such use, is contrary to all authoritative cases on the point in question.

Thiourea is an alipathic compound and is also an amino compound. Plaintiffs-appellants' witness testified fully that thiourea is a reducing alipathic compound and is also a reducing amino compound which was admitted by defendant appellee's witness. Thus, Dr. Van der Grinten testified that thiourea is a reducing agent (R. 93) and is a reducing aliphatic compound (R. 96) and is a reducing amino compound (R. 97). Dr. Lazar admitted on cross-examination thiourea is a reducing agent (R. 341). Dr. Loevenich admitted that thiourea is an amino compound (R. 367 and 374) and that thiourea is an alipathic compound (R. 375).

As to the error of law, the Trial Court's Memorandum Opinion holds that Van der Grinten testified that he had a certain theory of the invention, *i.e.,* that the discoloration of the background was caused by oxidation and, that if he added a chemical which would resist oxidation, he would, *ipso facto,* arrest this discoloration. He knew, as a chemist, and from many authorities, some of which were introduced in evidence (Plaintiffs' Exhibit 9), that a substance which can decrease the non-metallic part of a compound was termed a reducing agent. From the examples stated in the Reducing Agent Patent No. 1,821,281, it will be

noted, and the testimony so shows (R. 196-197), that a reducing agent is included in each of the formula set forth in the seven examples given by the patentee. The patentee was not limited to these specific reducing agents, since the law only requires a patentee to set forth one way in which his invention may be carried out as may be seen from the following decisions:

> *Standard Paint Co.* v. *Bird,* 175 Fed. 346 at 356.
> *Schumacher* v. *Buttonlath Mfg. Co.,* 292 Fed. 522, C. C. A. 9th, at 534.

The patent is not limited to either organic or inorganic reducing agents, although the patent states that organic reducing agents are preferred. The claims, however, express no such preference and contain no such limitation. The Trial Court did not hold that the thiourea used in defendant's paper was not within the definition of a reducing agent. It held that it may be described as a reducing agent under some circumstances. However, the Trial Court made an error in holding *that thiourea was not a reducing agent according to the theory of the invention as testified to by Dr. Van der Grinten.* In the foregoing quotation from the Memorandum opinion of the Court the phrase "such a reducing agent" has been italicized. That phrase is important because it refers back to the statement referring to the patentee's *theory* of how the reducing agent works as a chemical in the background of the print. It demonstrates that the Court erred in construing the law and in construing the patent and its claims. *The Court did not proceed on the basis of the question whether thiourea* is definable as a reducing agent, *but rather whether the plaintiffs-appellants had proved that thiourea acted according to the patentee's theory of the invention.* The evidence showed that thiourea came directly within the accepted and authoritative definition of a reducing agent: therefore, it *is* a reducing agent. Thiourea may have other characteris-

tics as well, but nevertheless, if it is a reducing agent *even under some circumstances,* it is a reducing agent. The Court stated that it *"did not believe that is important."* In view of the claims of the patent, we contend that it is extremely important and is a vital point in the case. For convenience of the court, claim 1 is quoted as follows:

> 1. The process of rendering the background of the diazotype prints substantially stable against discoloration which comprises including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints.

It will be noted that Claim 1 does not specify that the reducing agent must be a reducing agent under all circumstances. All that it is necessary to infringe this claim is to include a substance which is termed or named a reducing agent which is capable of arresting the discoloration in the background of the diazo print. *As thiourea is a reducing agent and as it is included in the background of the print, and as it arrests the discoloration of the background of the print, it infringes Claim 1.* Similarly, Claims 3 and 4 are infringed because thiourea is a reducing aliphatic compound and is also a reducing amino compound.

Patent No. 1,821,281 is not limited to any statement of how or when or for what period the reducing agent shall act. There is nothing in the patent which confines the patentees to a particular theory of invention. Neither the descriptive matter nor the claims of the patent state how the reducing agent acts chemically in the background of the finished print. Patent No. 1,821,281 broadly states (page 2 lines 55-61):

> "The invention is based on the observation that the discoloration of the background in all kinds of diazotype processes can be prevented, even for extended periods, if a reducing agent is added to the sensitive layer, or during or after development of the picture."

The claims, using claim 1 as an example, do not state that the reducing agent must act as a reducing agent in combination with the other chemicals in the background of the print; the claims state that step of the process as the inclusion "therein of a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints." This phraseology does not state that the reducing agent shall act according to any theory of invention; and it does not state how it shall act in connection with the other chemicals. It states, firstly, that it shall be a reducing agent and, secondly, that it shall be capable of arresting under normal conditions the discoloration of the background of the print. Whether its capability to accompish this result is, or is not, carried out according to the theory which was testified to by Dr. Van der Grinten or whether the reducing agent acts in a reducing manner in order to be capable of accomplishing the result is no part of the patent nor of the claims. *If the substance, thiourea, used in the sensitive layer of defendant's paper comes within the definition of a reducing agent, and if it is capable of arresting the discoloration of the background of the print, it is within the claims of the Patent.* The broad phraseology of the claims is here described because there is no contention by the defendant that thiourea is not an aliphatic compound or is not an amino compound.

This holding by the Trial Court in effect would require that plaintiffs-appellants must prove that thiourea *acted* as a reducing agent and in a reducing manner in the background of the finished print in connection with the chemicals present in the background. It is well settled law that a patentee does not even have to know the philosophy of how the invention operates and, further, neither does he have to prove the physical or chemical laws by which his process operates. *Thus, since a patentee does not have to know how his invention operates, he cannot be required to*

prove the physical or chemical laws under which it operates. All that the patent law requires is that a patentee set forth the process or mode of operation which ends in the result, and the means for working out the process or mode of operation. It is not essential or necessary that he either understand or set forth the principle on which the process operates. This is the law as stated in *Philadelphia Rubber Works Co.* v. *United States Rubber Reclaiming Works,* 229 Fed. 150 C. C. A. 2nd, at 151:

> "What did the patentee disclose? *He advanced no theory in his specifications: It was not necessary for him to do so.* All the law required of him was a plain statement of his process, set forth in sufficient detail to be understood by a person skilled in the art. If the result of his process is a product which he described as 'devulcanized rubber having substantially the characteristics of fresh rubber and capable of being used in like manner and for like purpose', and if it further appears that this is the first time that this particular process was disclosed to the world, Marks was entitled to his patent. *Whether he had some theory when he applied, or has one now, whether the experts have conflicting theories or not, are matters of no importance.*" (Italics ours)

Moreover, this is the rule as enunciated by this Court in *Petroleum Rectifying Co.* v. *Reward Oil Co.,* 260 Fed. 177, C. C. A. 9th, where at 181 it is stated:

> "But it was not essential that they should either understand or set forth the principle on which their process operated. In Andrews v. Cross (C. C.) 19 Blatch. 294, 305, 8 Fed. 269, Judge Blatchford said:
>
> > 'It may be that the inventor did not know what the scientific principle was or that, knowing it he omitted from accident or design, to set it forth. That does not vitiate the patent. He sets forth the process or mode of operation which ends in the result, and the means for working out the process or mode of operation. The principle referred to is only the why

> and the wherefore. That is not required to be set forth.'
>
> In Eames v. Andrews, 122 U. S. 40 at 55, the foregoing language of Judge Blatchford was quoted and approved."

Likewise, the rule is also stated in *Diamond Rubber Co.* v. *Consolidated Rubber Tire Co.,* 220 U. S. 428, at 435 and 436 as follows:

> "A patentee may be baldly empirical, seeing nothing beyond his experiments and the results, yet if he has added a new and valuable article to the world's utilities he is entitled to the rank and protection of such endeavor. And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention and it is immaterial whether he can stand a subsequent examination to the speculative ideas involved (citing cases) * * * It is no concern of the world whether the principle upon which the new construction acts be obvious or obscure so that it inheres in the new construction."

In a chemical case like the instant case, the rule is that a patentee does not have to prove or even understand, what chemical raction takes place in the chemicals which are brought together to accomplish the result. All that is required is that he prove the result which they accomplish. *The evidence shows that thiourea comes within the definition of a reducing agent and the Trial Court admitted that it did under certain circumstances, and that thiourea when present in the background of the finished print, accomplishes the result, namely arresting of the discoloration of the background.* Such evidence proves the result which thiourea accomplishes, and this is according to the rule as laid down in the case of *United Chromium* v. *International*

Silver Co., 53 Fed. (2d) 390, wherein at page 393 the Court states:

> "The prior publications and prior patents relied on by defendant do not teach the patentee's invention. On the contrary, they emphasize the fact that Fink's 'regulation' is one of the missing links in all prior chromium plating efforts. Defendant attempts to supply this line from other metal plating arts. But, inasmuch as a chemical action is involved here, analogy does not go a long way, because, while one can predict with confidence in mechanics in some instances, and in some cases where mathematics can be applied, in chemistry one almost entirely fails. In chemistry one cannot anticipate a result. A result may be obtained only by experiment. * * *
>
> The second Circuit Court of Appeals in General Electric Co. v. Laco Philips Co., 233 F. 96, affirmed Judge Mayer, and adopted his opinion in so doing. Judge Mayer held that the expert in that case stated the rule in the following way (page 103 of 233 F):
>
> > 'Chemistry is essentially an experimental science, and chemical prevision is as impossible today, in spite of the accumulation of the great knowledge, as it was in former times.'
>
> See, also, Naylor v. Alsop Process Co. (C. C. A. 8) 168 F. 911; Stevens v. Keating, 2 Web. 181; Toledo Rex Spray Co. v. California Spray Chemical Co. (C. C. A. 6) 268 F. 201."

Likewise, the Court in the case of *Chipman Chemical Engineer Company Inc.* v. *Reade Manufacturing Company, Inc.*, 56 F. (2d) 1048, at pages 1048 and 1049, states:

> "However, that may be, it is of no great moment here, since it is not to be assumed that either the inventor or this court is called upon to explain the infinite operations of nature which may take place in this combination of solids, gases, and liquids, and if it is made to appear that the formula presents a new and better effect in the method or art of killing weeds than was shown by any prior art disclosure, and it comes within the claims of the patent, it is valid as an invention."

Dr. Loevenich attempted to spin a yarn in his testimony and to speculate (R. 388-390) that thiourea forms an addition compound with certain chemicals present in the background and that this compound discolors less easily and is more resistant to oxidation than the substances before reacting with thiourea. Of course, this is nothing more than mere conjecture on the part of Dr. Loevenich and is wholly without foundation. It is significant that Dr. Loevenich gave no experimental evidence or proof to support his speculation and conjecture. As a matter of fact Dr. Loevenich did not conduct any experiments in the background of a diazotype print. *Accordingly, how can Dr. Loevenich guess much less testify under oath what chemical actions occur in the background of a print?* It is clear that Dr. Loevenich's speculation is without foundation and is worthless.

The chemicals in the background are of a very complex nature, and because of this, it is impossible for any chemist to determine with certainty, even if actual tests were made, just what reactions between the chemicals do take place, and how the various chemicals react with each other. As previously pointed out, the law does not require a patentee to prove the manner in which the chemicals react, but only requires proof that the chemicals are introduced into the chemical environment and that they produce the new result.

Not only has the defendant-appellee infringed process claims 1, 3 and 4 but it has also infringed process claims 7, 8, and 16. Thus, claim 7 covers the process of making diazotype prints involving the following:

1. Applying a diazo compound and a reducing agent capable of arresting discoloration of a background of a print.
2. Exposing such layer.
3. Contacting the exposed layer with a developer.

Claim 8 is similar to claim 7 and is directed to an amino compound. Defendant-appellant and those in privity with

it, employ each and every operation specified in claim 7. As thiourea used by defendant-appellant is not only a reducing agent but also an amino compound, claim 8 is infringed. Claim 16 is similar to claim 7 except that it specifies that the developer also contains a reducing agent capable of arresting discoloration of the background. As the defendant-appellant uses thiosulfate in the developer which the Trial Court has held to be a reducing agent and an infringement (R. 33, 34 and 41), it is evident that claim 16 is likewise infringed.

Claim 40 is a product claim and reads as follows:

> 40. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the back-ground of the finished print.

It is clear that defendant-appellee's Diepo Direcprint Paper No. 500 infringes this claim because it comprises (1) a base (R. 209) having a sensitive layer (R. 209) containing (2) a diazo compound (R. 211) bleaching upon exposure to light and (3) a reducing agent (thiourea) (R. 208) capable of arresting discoloration of the background of the finished print (R. 217-219). Claim 41 is a sub claim based on claim 40 and is specifically directed to an amino compound. As thiourea is an amino compound, claim 41 is likewise infringed.

CLAIMS 1 AND 25 OF THE REDUCING AGENT PATENT NO. 1,821,281 HELD TO BE INFRINGED BY THIOSULFATE.

The question of validity or invalidity is not before the Court because the defendant-appellee has taken no cross-appeal from the Decree of the District Court holding the Reducing Agent Patent valid nor as to those claims which were decreed to be infringed; nevertheless plaintiffs-appel-

lants are briefing, for the benefit of the Appellate Court and in substantiation of the Decree of the District Court, the question of validity.

With reference to the Decree of the District Court (R. 54, paragraph V), *the Court found that the invention of patent 1,821,281 is a pioneer invention, and, accordingly, is to be liberally interpreted* (Finding of Fact 15, R. 40); that patent 1,821,281 is good and valid in law, particularly as to claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 thereof sued on (R. 56, paragraph XIII, Finding of Fact 16, R. 40); and that defendant-appellee has infringed claims 1 and 25 of the aforesaid patent (R. 57, paragraph IV, and Finding of Fact 22, R. 41).

The claims discussed under this heading are those claims which the District Court decreed to be infringed, and with respect to which the defendant-appellee has not cross-appealed.

The practices of defendant-appellee in using and selling its Diepo Direcprint Paper No. 500 (Plaintiffs' Exhibit 27) and its developer therefor (Plaintiffs' Exhibit 28), have been heretofore discussed, together with directions for using such paper and developer (Plaintiffs' Exhibit 26, and Defendant's Apparatus "No Ink Developer" (Plaintiffs' Exhibit 36).

With reference to claims 1 and 25 of patent 1,821,281, claim 1 calls for the inclusion in the background of the finished diazotype print a reducing agent capable of arresting, under normal conditions, the discoloration of the components forming such background. Claim 25 calls for the steps of applying to a base a sensitive layer containing a diazo compound, exposing such layer, and contacting the exposed layer with a developer containing an azo dyestuff component and a reducing agent of the aforesaid type.

As regards the step of applying the sensitive layer to a base like paper as called for in claim 25, defendant contended that it does not take, of itself, this step, since it re-

ceived its sensitized paper from Germany. This same contention was also made as to claim 7 and 8 of patent 1,821,281 which includes the aforesaid step. Such a defense is mere subterfuge. Infringement is a tort for which all tort feasors are jointly and severally liable. In fact, there is no essential difference whether defendant obtained its paper containing the sensitive layer from a person who made it in Germany or from a person who made it "just around the corner." The essence of infringement is whether the acts of the defendant unlawfully deprive the plaintiffs of rights which are exclusively owned by the plaintiffs under the claims of the patent. An infringer may deprive the patent owner of lawful patent rights by direct action or he may equally deprive the patent owner of his lawful rights by contributing to and encouraging unlawful acts by others. A rather exhaustive comment on this phase of the law is to be found in the decision of *Bassick Manufacturing Co.* v. *Larkin Automotive Parts Co., et al,* 19 Fed. (2nd) 939, and in *Leeds and Catlin Co.* v. *Victor Talking Machine Company,* 213 U. S. 325.

Even if products may *per se* be non-infringing, infringement may be predicated thereon, if they are sold with knowledge or intent that they shall be put to an infringing use. *Lilly Co.* v. *Laucks, Inc.,* 68 Fed. (2d) 175, C. C. A. 9th.

The Trial Court correctly found that defendant has sold a sensitized copying paper together with a developer therefor containing a reducing agent, namely sodium *thiosulfate,* for the express purpose of making positive diazotype prints which have white backgrounds containing such reducing agent in the finished print capable of resisting discoloration of the background of the print to an appreciable extent for extended periods, and has practiced processes using said paper and developer for making positive diazotype prints having white backgrounds in which such reducing agent is present, all within claims 1 and 25 of patent 1,821,281. Accordingly, the Court held, and correctly so, that claims 1

and 25 are infringed. Apparently, in decreeing claim 25 infringed, the Court recognized that the defense advanced by defendant as to the step of applying to a base a sensitive layer, as called for in said claim, was entirely without merit.

THIOUREA IS AN EQUIVALENT TO THIOSULFATE HELD TO BE AN INFRINGEMENT AND THIOUREA IS ALSO AN EQUIVALENT TO AGENTS WITHIN THE SCOPE AND CLAIMS OF THE REDUCING AGENT PATENT NO. 1,821,281.

The Trial Court in Finding of Fact 15 (R. 40) held that the invention covered by The Reducing Agent Patent No. 1,821,281 *is a pioneer invention and is to be liberally interpreted.* While the Trial Court held this patent to be a broad patent and entitled to a liberal construction, yet the Court failed to give any liberal interpretation to it. In fact the Court did not even apply the doctrine of equivalents or give any consideration thereto. Plaintiffs are entitled to a range of equivalency for the substances which accomplish the same result in substantially the same manner, namely arresting the discoloration of the background of the finished print. Some of the decisions have stated that the equivalent must have been known at the date the patent in suit was issued, but this exception does not apply here, *since the reducing characteristics of thiourea have been known for at least fifty years* (Exhibit 10). *Walker on Patents,* 6th Edition, Section 415, page 505, states that both reason and authority now favor the rule that it is not even necessary that the equivalent should have been known at the date of the patent. For convenience, Section 415 is here quoted:

> "Section 415. Whether a device, in order to be an equivalent of another, must have been one at the time of the invention of the machine which contains the latter, is a question which was elaborately investigated

and discussed in Section 354 to 358 of the first two editions of this book; because it appeared to be not only important, but also unsettled. But the weight of reason was always much on the side of the negative of that question; and the weight of authority has now accumulated so preponderatingly upon the same side, that the question may now be held to be settled in the negative. An apparent exception has been made by one court which held a material which the patentee had tried unsuccessfully to use as an element of his combination but which was later successfully used by another cannot be an equivalent of the material actually described in the patent. It is therefore safe to define an equivalent as a thing which performs the same function, and performs that function in substantially the same manner, as the thing of which it is alleged to be the equivalent."

Where it was known at the time of the issue of the patent that a mechanical element or an ingredient had certain general characteristics, and those characteristics are employed to carry out the invention of the patentee in substantially the same way, then that is an equivalent of the element claimed by the invention of the patentee, regardless of whether anyone had ever employed that element or substance in the surroundings or environment set forth in the patent.

"It may be true that the defendant's peculiar form of stitch was unknown before; and it may also be true that his arrangement for carrying the buttons with their eyes upward and turning the eyes into a horizontal plane by the twisting of the conveyer-way was not known before. Of course, they were not known before in a machine for automatically sewing buttons to a fabric, because Morley's machine was the first to do that. But still, the defendant employs for the above purposes known devices, which in mechanics were recognized as proper substitutes for the devices used by Morley to effect the same results. * * *

"In this sense the mechanical devices used by the defendant are known substitutes or equivalents for those

employed in the Morley machine to effect the same result; *and this is the proper meaning of the term 'known equivalent,'* in reference to a pioneer machine such as that of Morley. Otherwise, a difference in the particular devices used to accomplish a particular result in such a machine would always enable a defendant to escape the charge of infringement, provided such devices were new with the defendant in such a machine, because, as no machine for accomplishing the result existed before that of the plaintiff, the particular device alleged to avoid infringement could not have existed or been known in such a machine prior to the plaintiff's invention."

Morley Sewing Machine Co. v. *Lancaster,* 129 U. S. 263; 32 L. Ed. 715 at 724. (Italics ours.)

The yardstick of measurement of what constitutes an equivalent of a chemical according to patent law is also supplied by the Supreme Court as follows:

"This term 'equivalent', when speaking of machines has a certain definite meaning, but when used with regard to the chemical action of such fluids as can be discovered only by experiment, it only means *equally good.*" (Italics ours.)

Tyler v. *Boston,* 7 Wall. 330; 19 L. Ed. 93.

The same rule is applied in the case of *Edison Electric Light Co.* v. *Boston Incandescent Lamp Co.,* 62 Fed. 397 (at 399):

"In dealing with a pioneer invention which creates a new art, it hardly seems logical or reasonable to say that, because in the progress of the art some new substance or device has been discovered, which can act as a substitute for one of the elements of a patented combination, anyone can appropriate the invention by the employment of such substitute. And further, if equivalency signifies equivalency in the particular combination or invention, it is difficult to point out in this class of cases what known equivalents existed at the date of the patent, for the reason that the combination of ele-

ments in which the invention is embodied was first made known by the patentee. The doctrine of equivalents, as applied to primary inventions, rests upon a more satisfactory basis by the elimination of the qualification of age or time, and by holding those things to be equivalents which perform the same function in substantially the same way. *The fundamental question is whether the alleged infringer makes use of the essence of the patented invention;* not whether he had adopted a known equivalent or made a patentable improvement on the invention." (Italics ours)

Moreover, this same rule is applied and elaborately discussed in the case of *McCormick Harvesting Machine Co.* v. *C. Aultman & Co.,* 69 Fed., 371, where at 386 and 387 the Court states as follows:

"The rule as to infringements of pioneer inventions which point the way to new products or results is analogous to that applied in cases of infringement of process patents in which the discoverer is only required to point out one practical method of using his process, and is permitted to claim tribute from all who thereafter use the process whether with his apparatus or with a different or improved means. In Machine Co. v. Lancaster, 129 U. S. 263, 290, 9 Sup. Ct. 299, the Supreme Court said:

'Where an invention is one of primary character, and the mechanical function performed by the machine as a whole are entirely new, all subsequent machines which employ *substantially* the same means to accomplish the same result are infringements, although the subsequent machine may contain improvements in the separate mechanisms which go to make up the machine.' (Italics ours)

See also, Consolidated Valve Co. v. Crosby Valve Co., 113 U. S. 157, 5 Sup. Ct. 513; Royer v. Belting Co., 135 U. S. 319, 10 Sup. Ct. 833; Machine Co. v. Murphy, 97 U. S. 120; Sessions v. Romadka, 145 U. S. 29, 12 Sup. Ct. 799; Clough v. Barker, 106 U. S. 166, 1 Sup. Ct. 188; Winans v. Danmead, 15 How. 330; McCormick v. Talcott, 20 How. 402, 405; Railway Co. v. Sayles, 79 U. S. 554, 556."

In the case of *Elliot Addressing Machine Co.* v. *Wallace Addressing Machine Co.*, 39 Fed. (2d) 233, the Court at 235 and 236 stated as follows:

> "* * * infringers have uniformly failed in attempting to take refuge from the common-sense doctrine of equivalents by invoking the subtleties of chemistry. * * *
>
> "Stencils, however, are not made for use in chemistry but for use in business, and one must look at the purpose of the invention as well as the wording of the patent in order to determine whether the infringing device comes within it or not. * * *
>
> "The doctrine of equivalents in chemical patents was defined by Judge Lacombe with a most felicitous phrase in Treibacher Chemische Werke Gesellschaft, etc., v. Roessler & Hasslacher Chemical Co., 219 F. 210, when he said, speaking for the Court of Appeals, at page 212:
>
> > 'We are satisfied that the 'equivalency' of other metals with iron is to be found, not in their chemical structure, but in their functional efficiency when combined with cerium in a metallic alloy.'
>
> "It is clear here that from the point of view of 'functional efficiency' the ammonia alum used by the defendant here as a coagulating agent corresponds, by its effect, in making a stencil like the plaintiffs', to the dichromate of potassium of Fuller's preferred method."

It is admitted that thiourea arrests discoloration of the background of the finished print, and the Court so found, and in every experiment witnesses Klein and Van der Grinten made, thiourea came within the definition of a reducing agent as defined by acknowledged authorities and also as defined by the Steinfur decision *supra*. Neither of defendant's experts defined what chemical classification thiourea belonged to, if it was not in fact defined as a reducing agent; nor would defendant's experts define how it manages to arrest the discoloration of the print except by act-

ing in the same manner as a well recognized reducing agent would act, other than to advance the theory based upon pure conjecture that it entered into a "complex". It has been conclusively proven by the evidence that *thiourea is a reducing agent,* because it manifests characteristic reducing properties according to the authorities, Mellor (Exh. 9) and Rathke (Exh. 10), and the actual tests of Dr. Van der Grinten (R. 94-95). Furthermore, thiourea meets every rule of equivalency announced by the Supreme Court. It was known that it would reduce cupr*ic* chloride ($CuCl_2$) to cupr*ous* chloride (CuCl) as early as 1884 (Exh. 10); admittedly, it accomplishes the same result of resisting discoloration of the background of the finished print; and the test of whether chemical substances are equivalents is whether they are equally good in the same environment. (*Tyler* v. *Boston, supra*); the only criterion as to whether it accomplishes the same result in substantially the same way, is by experiment: and by those experiments thiourea is shown to have the characteristics of a reducing substance. (*Tyler* v. *Boston, supra.*)

Its use by defendant in its process and product "makes use of the essence of the patented invention" and is not to be excused by invoking "the subtleties of chemistry" of substances which are "equally good" in an attempt to avoid infringement of a broad invention. To permit defendant to avoid infringement because defendant's witnesses contend that the name "reducing agent" does not apply to thiourea would be to sanction appropriation of the "essence of the patented invention" by change of names rather than by substance and effect. The Supreme Court has repudiated such a rule:

> "Authorities concur that the substantial equivalent of a thing, in the sense of the Patent Law, is the same thing as the thing itself; so that if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in *name,* form or shape." (Italics ours.)

The Union Paper Bag Machine Co. v. *Murphy,* 97 U. S. 120; 24 L. Ed. 935, 936 and 937.

Thiosulphate has been held to infringe claim 1 of The Reducing Agent Patent (R. 33, 34, 41 and 43). Plaintiffs-appellants' witness, Dr. Van der Grinten, testified (R. 89) regarding the definition of a reducing agent and said that:

> "We consequently may define a reducing agent as a substance capable of taking off oxygen out of a chemical compound or a substance which is oxidizable, or we may say a reducing agent also is a substance which is capable of taking off chlorine out of cupric chloride; that is to say, reducing the non-metallic part of a metal salt and taking off the non-metallic part wholly or in part out of such compound."

Dr. Van der Grinten testified (R. 89) that the foregoing definition was in accord with that given by the well-known chemist, J. W. Mellor. The definition of the term "reducing agent" in claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 in The Reducing Agent Patent was clearly given by Dr. Van der Grinten (R. 91, 92) and the questions and answers are quoted as follows:

> "Q. Will you please define the term "reducing agent capable of arresting under normal conditions the discoloration of components forming the background of such prints as it appears in claims 1, 3, 4, 7, 8, 16, 25, 40 and 41 of this patent?
>
> A. As such reducing agent I would define a substance which has the reducing capacity, according to the foregoing definition, and at the same time the capacity of arresting the discoloration of the background under normal conditions of storage for extended periods in a diazotype print.
>
> Q. Will you please give some examples of such reducing agent?
>
> A. As examples of organic reducing agents I could give, for instance, aldehydes, polyoxy compounds, like citrates, tartrates, glucose, amino compounds, like, for instance *thiourea.* As an example of an inorganic re-

ducing agent I would like to name sodium *thiosulfate.*'' (Italics ours.)

Subsequently, Dr. Van der Grinten testified fully regarding *thiosulfate as a reducing agent* and the following questions and answers (R. 95 and 96) are especially pertinent thereto:

> ''Q. In your answer to a preceding question you cited sodium thiosulfate as a reducing agent. Will you explain why that is a reducing agent?
>
> ''A. Sodium thiosulfate is a reducing agent because it is capable of reducing ferric chloride to ferrous chloride, a similar reaction as the one described earlier for cupric chloride, and consequently falls under the definition of the reducing agent by Mellor. Thiourea I might remark, is a classical example of a reducing agent—
>
> ''Q. Are you referring to thiourea?
>
> ''A. I am referring to sodium thiosulfate. Sodium thiosulfate is a classical example of a reducing agent. When a student at the university studies chemistry sodium thiosulfate will be one of the reducing agents he will make an acquaintance with.''

When Dr. Van der Grinten was asked (R. 98) whether *thiosulfate* arrested discoloration in the background of a diazo print, he said that *he subjected it to the same test as thiourea and obtained exactly the same result.* For convenience, the question and answer (R. 98) are quoted as follows:

> ''Q. Will you please state whether or not sodium thiosulfate when present in the background of a diazo print acts to arrest the discoloration of such background?
>
> A. It does and I have made that sodium thiosulfate test in exactly the same way as described in my foregoing answer for thiourea, and I obtained exactly the same result.''

In view of the foregoing, there is not the slightest doubt that *thiosulfate is a reducing agent within the Reducing Agent Patent and arrests discoloration of the background of diazo prints.*

As a matter of fact, defendant-appellee's witness, Dr. Loevenich agreed with the foregoing and said (R. 356) that:

> "*I do not contest that* Sodium *thiosulphate*, Tartaric acid, and citric acid react *as reducing agents on the paper.*" (Italics ours.)

The Trial Court said in its Memorandum Opinion (R. 33) that:

> "It is conceded that sodium *thiosulfate,* commonly known as 'hypo', is an inorganic reducing agent."

Thiosulfate was said to infringe claims 1 and 25 (R. 34). In Finding of Fact 22 (R. 41), the Trial Court found that:

> "* * * the Defendant, Dietrich-Post Company, has sold a sensitized copying paper combined with a developer having a reducing agent; namely, sodium *thiosulphate,* therein, for express purpose of making positive diazotype prints which have white backgrounds containing such reducing agent in the finished print capable of resisting discoloration of the background of the print to an appreciable extent for extended periods; and has practiced processes using said paper and developer for making positive diazotype prints having white backgrounds containing such reducing agent in the finished print capable of resisting discoloration of the background of the print to an appreciable extent for extended periods; all within claims 1 and 25 of Letters Patent in suit No. 1,821,281." (Italics ours.)

Throughout the testimony, it is clear that *thiourea acts in the same manner as thiosulfate.* Thus, Dr. Loevenich admitted that *thiosulfate* arrests discoloration of the background (R. 411). For convenience the question and answer are quoted as follows:

> "X12. If the presence of *thiosulfate* in the white background of the positive diazotype print made by the process as set out in question X5, prevents the action of the oxidizing substances of the atmosphere upon

the discoloration producing components also present in the background, does this not also indicate that *thiosulfate* has the additional property of arresting under normal conditions of storage or keeping, this discoloration of the background of said print?

Answer. Yes." (Italics ours.)

The same question was asked of Dr. Loevenich of *thiourea* and he also answered in the affirmative (R. 401). This question and answer are as follows:

"X18. If the presence of thiocarbamide in the white background of the positive diazotype print, made by the process as set out in question X10, prevents the action of the oxidizing substances of the atmosphere upon the discoloration producing components also present in the background, does this not also indicate that thiocarbamide has the additional property of arresting under normal conditions of storage or keeping this discoloration of the background of said print?

Answer. Yes."

It is to be noted that *thiocarbamide is the same as thiourea* (R. 95).

Dr. Loevenich again and again mentions and treats *thiourea* along with *thiosulfate,* tartaric acid, citric acid and other reducing agents. Attention is directed to the answer of Dr. Loevenich to question "X8" (R. 356) which reads as follows:

"I do not contest that Sodium *Thiosulphate,* Tartaric Acid and Citric Acid react as *reducing agents* on the paper." (Italics ours.)

Then again in answer to question "X9" (R. 357 and 358) he again treats *thiourea* along with *thiosulfate* and other reducing agents. His answer is as follows:

"Answer. The introduction of such components takes place both on applying the diazo solution to the paper (*Thiourea,* Tartaric Acid, Citric Acid) or when the developing solution is applied on the light-exposed print (*Thiourea, Thiosulphate*)." (Italics ours.)

Again in answer to Interrogatory No. 10 (R. 359), Dr. Loevenich admits that *thiourea* arrests the discoloration of the background of prints like formaldehyde and its derivatives specifically mentioned in The Reducing Agent Patent (See lines 41, 56, 82, 100 and 121 of page 4) and tartaric acid and citric acid.

All doubt on the subject of *the equivalency of thiourea and thiosulfate* is removed by Dr. Loevenich's answer (R. 388 and 389) to Interrogatory No. 19 (R. 388) which reads as follows:

> "Answer. Yes, *Thiourea* prevents discoloration.
>
> * * * * * * * * *
>
> It is known that the same action can be obtained by adding the reducing agent Sodium *Thiosulphate* to the developer liquid used for the light-exposed diazotype paper. I mention here only *Thiosulphate* as a reducing agent because all other reducing agents are practically useless when added to the light sensitive layer or the developer. Furthermore, in cases where they are usable, their action in the retarding of the yellowing of developed diazo prints is much inferior to that of both of the above-mentioned ingredients (*Thiourea,* Sodium *Thiosulphate*)." (Italics ours.)

Thiosulfate contains sulfur as shown by tests (R. 229) and has the formula $Na_2S_2O_3$ (R. 403). *Thiourea* has the formula CSN_2H_4 (R. 374 and 382) and contains sulfur as denoted by the letter "S" in the formula. The prefix "*thio*" means sulfur. It is clear that both *thiosulfate and thiourea are sulfur compounds. The equivalency of sulfur compounds has been well recognized* not only by the Van der Grintens but by the art. Thus, in the Defendant's own Exhibit "E", there is a recognition of the equivalency of sulfur compounds and a clear cut statement that when sulfur compounds are incorporated in the light sensitive layer of a diazotype print, the yellowing or discoloration of the background of the pictures can be

avoided. For convenience lines 25-35 of page 1 of Defendant's Exhibit E are quoted as follows:

> "It may happen, for instance that when the ammonia gas is caused to act for a considerable time, the ground of the pictures becomes more or less yellow or that in some rare cases the fastness to light of the pictures is not quite satisfactory.
>
> We have now found that the said drawbacks can be avoided if *sulfur compounds* are incorporated into the light-sensitive layer." (Italics ours.)

Subsequently in lines 43 and 44, it is even stated that "*colloidal sulfur, too, produces already the desired effect*". In view of these clear-cut statements, there can be no question that *sulfur compounds are equivalent* and that *thiourea is equivalent to thiosulfate.*

Dr. Van der Grinten has testified that *thiourea is a reducing aliphatic compound* (R. 96) and *thiourea is a reducing amino compound* (R. 97). Dr. Loevenich admitted that *thiourea* or *thiocarbamide* is an amino compound and is an aliphatic compound (R. 374 and 375) and Dr. Lazar likewise made a similar admission (R. 322).

Thiourea was termed a reducing agent by Dr. Van der Grinten who proved it by tests (R. 93-95). For convenience, Dr. Van der Grinten's answer (R. 93) is as follows:

> "I term *thiourea* a reducing agent because *thiourea* is capable of reducing the non-metallic part of a metal salt; for instance, it is capable of reducing cupr*ic* chloride, which consists of one atom of copper with two atoms of chlorine to cupr*ous* chloride, which consists of a molecule containing only one atom of copper and one atom of chlorine." (Italics ours.)

When defendant-appellee's witness, Dr. Lazar, was asked what would be the definition of an organic reducing agent (R. 326), he replied that:

> "I could say that an organic reducing agent is such a substance which reduces cupr*ic* salt to cupr*ous* oxide, * * *" (Italics ours.)

In other words, both the expert witness of plaintiffs-appellants and of the defendant-appellee agree that a reducing agent can reduce a cupr*ic* compound to a cupr*ous* compound. Dr. Van der Grinten proved by tests that *thiourea reduces cupric chloride to cuprous chloride* and *cupric acetate to cuprous acetate* (R. 94 and 95). This latter acetate test of Dr. Van der Grinten stands uncontroverted. Inboth of these tests *thiourea* reduced a cupr*ic* compound to a cupr*ous* compound and, therefore, comes squarely within both definitions given hereinabove for a reducing agent. As *thiourea* comes within the definition of a reducing agent, it must be a reducing agent. There is a tacit admission of the foregoing by defendant-appellee's witness, Dr. Lazar, on page 341 of Transcript of Record. The question and answer are as follows:

> "Q. If that were so then according to Mellor's own definition which you have just read, it would be a reducing agent?
> A. Yes."

Dr. Lazar likewise admits (R. 337-339) that *thiourea* reacts with cupr*ic* chloride to give off chlorine and that cupr*ic* chloride is changed to cupr*ous* chloride. As *thiourea* changes cupr*ic* chloride to cupr*ous* chloride which is a reducing action within Dr. Lazar's own definition, it is evident that *defendant-appellee admits that thiourea is a reducing agent.*

By referring to the Memorandum Opinion (R. 33 and 34) and the Findings of Fact (R. 41 and 42), it appears that *thiosulfate* is a reducing agent and is capable of arresting discoloration in the background of a diazo print and, therefore, that *thiosulfate* infringes claims 1 and 25 of The Reducing Agent Patent. Not a single word is mentioned in the Opinion or in the Findings of Fact that *thiosulfate* must act as a reducing agent *"when used in connection with the chemicals present in the backgrounds of diazo prints."*

Nevertheless, the Trial Court holds that *thiourea* must

act as a reducing agent "when used in connection with the chemicals present in the background of prints". It seems strange indeed that *thiosulfate* had been held to be an infringement of the patent whereas *thiourea* is not an infringement and that one requirement specified for the infringement of the patent by *thiosulfate* and a different requirement is specified for infringement by *thiourea.* It is respectfully submitted that the Trial Court erred in establishing this dual standard, one for *thiourea* and one for *thiosulfate.* It is believed that the equity requires one standard to be used for *thiourea* and *thiosulfate.* If a single standard is used, there is no doubt that *thiourea* will be held to be an infringement of the patent. Adequate, reliable and convincing proof was offered to prove *thiosulfate* was a reducing agent and was included in the background of a diazo print and was capable of arresting the discoloration of the background. Similar proof and, in fact, practically identical proof was offered to prove *thiourea* was a reducing agent and was included in the background of a diazo print and was capable of arresting the discoloration of the background. *Thiosulfate* was held to be an infringement whereas *thiourea* was held not to infringe.

It is believed that *thiourea* is a clear-cut equivalent of *thiosulfate* and infringes claim 1 just like *thiosulfate.* Claim 1 reads as follows:

> "1. The process of rendering the background of the diazotype prints substantially stable against discoloration which comprises including therein a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of said prints."

It will be observed that there is nothing in this claim which applies to *thiosulfate* and not to *thiourea.* The claim calls, in essence, for *including a reducing agent capable of arresting discoloration in the background of the print.*

It was proved to the satisfaction of the Trial Court and admitted by defendant-appellee that *thiourea* arrested the discoloration of the background. It was proved to the satisfaction of the Trial Court that *thiourea* was included in the sensitive layer of the paper base. It was proved to the satisfaction of the Trial Court that *thiourea* was a reducing agent. In view of this proof it is believed that *thiourea* infringes claim 1.

It was proved that *thiourea* is an aliphatic compound and is also an amino compound which the witnesses of the defendant-appellee admitted. In view of the fact that *thiourea* is a reducing aliphatic compound and is a reducing amino compound, it is clear that *thiourea* likewise infringes claims 3 and 4. Similarly claims 7, 8 and 16 are infringed due to the fact that the Diepo Direcprint Paper of defendant-appellee is exposed to light and is contacted with a developer containing a reducing agent (*thiosulfate*).

Product claim 40 is likewise infringed by *thiourea*. This claim reads as follows:

> "40. As a new product, a base having a sensitive layer thereon containing a diazo compound bleaching upon exposure to light, and a reducing agent capable of arresting under normal conditions the discoloration of the components forming the background of the finished print."

It will be noted that the Diepo Direcprint Paper contains every element specified by this claim. The base is paper having a sensitive layer containing a diazo compound and a reducing agent (*thiourea*) capable of arresting discoloration is in said layer. Similarly, claim 41, which is a subclaim based on claim 40, is infringed because *thiourea* is an amino compound.

In the foregoing quotations, it is to be observed that Dr. Loevenich always mentions *thiourea* in connection with *thiosulfate,* and *formaldehyde.* The equivalency of *thiourea* and *thiosulfate* has been established hereinabove be-

yond a shadow of doubt. It will now be demonstrated that *thiourea is equivalent to formaldehyde.* In the Reducing Agent Patent, it is specifically stated that a *preferred* reducing agent is an *aldehyde* (Page 2, lines 60 to 65). Formaldehyde is a member of this class as its name implies and as is well known. In Examples Nos. 1 and 2 of The Reducing Agent Patent, the Van der Grintens specifically teach *the use of formaldehyde.* In view of the specific reference to *formaldehyde* in lines 40 and 56 of page 4, there cannot be the slightest doubt regarding the fact that *formaldehyde* is one of the Van der Grintens' reducing agents and is within the scope of the claims of the Reducing Agent Patent in suit. As Dr. Loevenich has repeatedly referred again and again to *thiourea along with formaldehyde,* there cannot be the slightest question that *they are equivalent.* In view of the fact that *formaldehyde is specifically mentioned in the Reducing Agent Patent and is within the scope of the claims thereof, it must necessarily follow that thiourea is within the scope of the claims.* Accordingly, it is evident that *thiourea is equivalent to formaldehyde and infringes claims 1, 3, 4, 7, 8, 16, 40 and 41* of the Reducing Agent Patent.

JUDICIAL DECISION BY SWISS COURT HOLDING THIOUREA TO BE A REDUCING AGENT AND AN INFRINGEMENT IN A CASE INVOLVING THE SWISS VAN DER GRINTEN PATENTS CORRESPONDING TO THE REDUCING AGENT PATENT NO. 1,821,281 HERE IN SUIT AND INVOLVING DIAZOTYPE PAPER MADE BY RENKER-BELIPA AND CORRESPONDING TO DEFENDANT-APPELLEE'S DIEPO DIRECPRINT PAPER.

A suit which is squarely on all fours with the present one has just been decided by a Swiss Court in favor of plaintiff-appellant Van der Grinten. As this suit involved Renker-Belipa Company, which is the same company which

supplied the defendant-appellee with its diazotype print paper and which was referred to by defendant-appellee's witness Post (R. 430 and 431 and Defendant's Exhibit N) and as the diazotype print paper and developer involved corresponded to defendant-appellee's Diepo Direcprint Paper and Developer, it is believed that the decision of the Swiss Court should carry great weight in the present appeal.

This suit was brought by Frans Van der Grinten et al. in the State of Zurich, Zurich, Switzerland, against Renker-Belipa et al. for infringement of the Swiss Van der Grinten patents corresponding to the Reducing Agent Patent No. 1,821,281 here in suit on account of Renker-Belipa's use and/or sale to others for use, of a sensitized diazotype copying paper and developer therefor, known as "Saphir Paper and Saphir Developer" and corresponding to defendant-appellee's Diepo Direcprint Paper and Developer. The fact that Renker-Belipa supplied defendant-appellee was testified to by defendant-appellee's witness Post who stated at R. 431 that

> "We receive our Direcprint paper and developer therefor from the Renker-Belipa Company in Germany, the people who wrote that letter."

In the Swiss suit just like in the instant case, it was proved that the diazotype copy paper of Renker-Belipa contained thiourea. During the trial of the Swiss suit, Renker-Belipa contended, just like defendant-appellee has in the instant case, that thiourea was not a reducing agent whereas Van der Grinten et al. contended that thiourea was a reducing agent. The Court then appointed as its representative an impartial, authoritative and outstanding expert, Professor Nageli, to consider and investigate the evidence and render an opinion as to whether thiourea was or was not a reducing agent. Accordingly, the Court's impartial expert, Professor Nageli, after due consideration and investigation of the matter rendered an opinion that *thiourea was*

unquestionably a reducing agent. Not only did the Swiss Court's expert hold that thiourea was a reducing agent but also held that *thiourea when present in combination with the chemicals of the background of the finished diazotype print, arrested the discoloration of said background by acting in a reducing manner.* The Court then adopted its expert's holdings and rendered a decision confirming the holdings of its expert Professor Nageli that thiourea is unquestionably a reducing agent and that Renker-Belipa Saphir Diazotype paper containing thiourea is an infringement of the claims of the Van der Grinten Swiss patents. A certified copy of the decision of the Swiss Court and a translation thereof will be submitted hereinafter and plaintiffs-appellants will ask leave to file a certified copy thereof, together with a verified translation at the time of hearing of this appeal.

THE THIN FILM PATENT NO. 1,841,653.

As the defendant-appellee has taken no appeal on the Thin Film Patent, it is not an issue in the present appeal and is not before this Court. For the benefit of the Appellate Court, however, a brief summary will be given about the Thin Film Patent.

Claims 1, 3, 4, 6, 8, 11, 13, 15, 16 and 18 of the Thin Film Patent are charged to be infringed, and the Lower Court held all of such claims to be valid and infringed.

The invention of patent 1,841,653 is likewise concerned with the manufacture of positive diazotype prints, but with only the development or fixation of the exposed diazo print (R. 102-103). The exposed print is the print having the latent image in faint yellow outline on a white background, prior to development or fixation.

Prior to this invention, it was customary in this art to develop such prints by immersing the print in a bath of developer containing an azo dyestuff component and an alkaline substance. This method, however, is disadvantageous

in that the soluble azo dyes formed during development merge, usually more or less, with the result that the images obtained are not sharp and the clearness of the background is affected; and in that an excess of developer is applied, necessitating drying of the print (R. 104, and lines 88 to 93 of page 1 of patent No. 1,841,653).

It was also customary in this art, prior to this invention, to develop such prints by subjecting the print to the action of a gaseous alkali like ammonia. In this form of development, an exposed print is used which has been obtained from a copying paper having a sensitive layer thereupon having both the diazo compound and the azo dyestuff coupling component. While by this method, developing baths are dispensed with and the prints thus developed need not be dried, such method has its advantages in that the development operation is comparatively lengthy, especially in the winter, and when no complicated mechanical apparatus is used, this developing operation is obnoxious because of the unpleasant and injurious ammonia vapors emitted during the development operation and which adhere to the print itself long after it is completed (R. 103, and lines 57-75 of page 1 of patent 1,841,653).

It is the excess of the developer in both of these prior methods that cause the disadvantages described above (R. 104-105).

According to the process of the patent, a developing liquid containing a non-volatile alkaline substance is employed, and such developer liquid is applied to only the exposed surface of the print by saturating said surface throughout its entire area with such developer liquid by spreading the said liquid on said surface in the form of a uniformly thin film, the quantity of the developing liquid contained in the film corresponding substantially to that required to effect development or fixation of the exposed surface. Briefly stated, the process involves the use of a developing liquid containing a non-volatile alkaline substance,

and applying such liquid in the form of a thin film to only the exposed surface in quantity sufficient to effect development. By this manner of application, an excess of developer liquid is avoided, the print is almost dry and ready for use or delivery to a customer, thus avoiding delay, and cheapening the prior art process by economy of time and amount of developer used (R. 105, and line 94 of page 1 to line 5 of page 2 of patent 1,841,653).

Prior Art Affirms Patentability of Thin Film Patent.

Defendant-appellee has urged as anticipations against the claims of the Thin Film Patent the U. S. patent to Kogel of Kalle & Company No. 1,444,469 (Defendant's Exhibit C) which is the same patent brought forward by defendant-appellee against the Reducing Agent Patent and previously discussed, and a German patent to Gronau No. 427,570 (Defendant's Exhibit D; R. 67), either alone or in combination. Besides, defendant-appellee attacked the claims of the Thin Film Patent as being invalid because of double patenting.

Kogel Patent.

The Kogel patent was urged as an anticipation against the claims of the Thin Film Patent, especially with reference to examples 1, 2, and 9 thereof. With reference to example 9, defendant's expert, Dr. Lazar testified (R. 271) that therein there is specified a development of the exposed diazotype print with a bath containing an azo dyestuff coupling component (resorcinol) and ammonia dissolved in water (page 3, lines 59 to 65), and with respect to example 2 that in such example the development is effected with an alkali solution such as sodium hydrate solution.

With reference to example 9 of said Kogel patent, Dr. Lazar, upon cross-examination, admitted (R. 308-311) that 1) the developing liquid described therein was not impressed solely upon the surface to be developed; 2) nor was

it impressed in the form of a uniformly thin film; 3) nor was the developer applied so that the exposed surface only of the exposed print is saturated throughout its entire area with the developing liquid in the form of a uniformly thin film; 4) nor that the excess of the developing liquid is immediately removed after the exposed surface is saturated with a uniformly thin film. But to the contrary, Dr. Lazar testified that in the Kogel patent, the developer was applied by means of a *bath* whereby the developing liquid was not only applied to the exposed surface but also the back or base paper.

Relative to example 1 of this Kogel patent, Dr. Lazar testified (R. 344) that in such example there is disclosed a developing liquid consisting of an alkaline solution of resorcinol, the resorcinol being an azo dyestuff coupling component. According to this example, the exposed print is put into a solution of such developing liquid, and hence application of the developing liquid is by immersion or a bath, (lines 108-111 of page 2 of the Kogel patent, defendant's Exhibit C). Inasmuch as the developing liquid is the same as that specified in example 9 of this same Kogel patent, the admissions by Dr. Lazar, previously referred to, apply here.

With regard to example 2 of this Kogel patent, Dr. Lazar, upon cross-examination, admitted (R. 312-314) that the process of such example produced an intermediate *negative* diazotype print, that negative and positive diazotype prints are entirely different, and that the invention of the second patent in suit is for developing a finished *positive* diazotype print.

On cross-examination, Dr. Lazar admitted (R. 335) that the method of applying the developer in this Kogel patent differed from that of the second patent in suit.

Prior patents or publications must disclose and exhibit the invention in such full and complete form that the patent in suit could be duplicated without involving more than mechanical skill, and the anticipating reference must be

able to accomplish the same result with equal efficiency. In this connection attention is invited to the case of *Naylor* v. *Alsop,* 168 Fed. 911, C. C. A. 8th.

Gronau Patent.

Defendant has advanced the Gronau patent (Defendant's Exhibit D), as an anticipation against the claims of patent No. 1,841,653. Defendant's expert, Dr. Lazar testified (R. 269) that the Gronau device would function to impress a thin film of a developer upon a diazo print. Upon cross-examination, Dr. Lazar admitted (R. 328-331) that in the Gronau patent the development is effected by means of a gas; that the Gronau device and that shown in the second patent in suit are different in structure and operation; that development by means of a gas is different than with a liquid; and that he has made no practical tests comparing the Gronau device and that shown in the second patent in suit. Defendant has admitted by stipulation (R. 331, 332) that the Gronau patent does not describe the process of developing positive diazo prints embodying the features of the claims of the second patent in suit.

Plaintiffs' Expert, Dr. Van der Grinten testified (R. 436-441) that he had made actual experiments with the Gronau device, and found that the Gronau device will not accomplish the same results as the process of the second patent in suit.

Kogel and Gronau Patents.

Defendant has also advanced the combination of the German patent to Gronau No. 427,570 (Defendant's Exhibit D, R. 67) and the Kogel U. S. patent No. 1,444,469 (Defendant's Exhibit C, R. 66) as an anticipation against the claims of the second patent in suit, namely, No. 1,841,653.

Defendant's expert, Dr. Lazar, admitted no practical tests of combining Gronau and Kogel. Plaintiffs' expert, Dr. Van der Grinten, testified (R. 437-441) that he made tests and that when you do attempt to combine Gronau

and Kogel, it is impossible to carry out the process of the second patent in suit.

In this connection, it is important to note that this same ground of anticipation was urged by the Patent Office during the pendency of the application corresponding to the second patent in suit. On this ground, a British patent to Green, No. 7435 of 1890, was cited by the Patent Office in the same relation that the Kogel patent is urged here. Attention is invited to Plaintiffs' Exhibit No. 4 (R. 66), 3rd paragraph of page 31, and pages 32 to 41.

A new combination of known devices or processes, producing a new and useful result is evidence of invention, and may be the subject of letters patent.

Webster Loom Co. v. *Higgins,* 105 U. S. 580, 26 L. Ed. 1177.

National Hollow Brakebeam v. *Interchangeable Breakbeam,* 106 Fed. 693 (C. C. A. 8th).

Defendant-Appellee's Contention of Double Patenting Against Thin Film Patent No. 1,841,653 Unworthy of Consideration.

Defendant's contention of double patenting as regards the second patent, No. 1,841,653, is hardly worthy of consideration because the invention of the first patent, No. 1,821,281, is for the process of making a finished diazotype print and the sensitized paper for use in such process, while that of the second patent is for a mode of effecting development of the exposed diazo print. If the second patent were issued to a stranger, certainly it would not be void because of the first patent even though operations under it might infringe the first patent. This is the rule as laid down in

Expanded Metal Co. v. *Bradford,* 214 U. S. 366.

Norton v. *Jensen,* 90 Fed. 415, C. C. A. 9th.

Dayton v. *Westinghouse,* 118 Fed. 562, C. C. A. 6th.

Palmer v. *Brown,* 92 Fed. 926, C. C. A. 1st.

Claims 1, 3, 4, 6, 8, 11, 13, 15, 16 and 18 of Thin Film Patent No. 1,841,653 Held to be Infringed.

Mr. Klein testified that defendant's apparatus, sold under the trade-name "No-Ink Developer" as shown in their advertising folder (Plaintiffs' Exhibit 36), is substantially similar in operation to the device shown in patent No. 1,841,653. (R. 243-246.) As previously pointed out, defendant has admitted (R. 248-252) that it has applied its developer to the exposed prints made with its Diepo paper by the apparatus known as the "No-Ink Developer" and shown on its advertising folder (Plaintiffs' Exihibt 36). Its developer contained *thiosulfate,* admittedly a reducing agent.

The Trial Court correctly found that defendant, by using and offering for sale its sensitive paper and developer, and device for applying the developer in a uniformly thin film called the "No-Ink Developer," has infringed all of the claims in suit of patent No. 1,841,653, namely claims 1, 3, 4, 6, 8, 11, 13, 15, 16, and 18. For convenience, the claims may be divided into the following groups: (1) claims 1 and 3; (2) claims 4, 6, and 8; (3) claim 11; and (4) claims 13, 15, 16, and 18. The first group of claims is essentially directed to an alkaline developing liquid containing an azo dyestuff coupling component and the impressing of such liquid upon the surface to be developed in the form of a uniformly thin film, whereas the claims of the second group are directed to a developing liquid containing a nonvolatile alkaline substance and saturating the exposed surface of the exposed print throughout its entire area with such developing liquid in the form of a uniformly thin film; the third group is essentially directed to the development of an exposed print obtained from a light sensitive layer that contains a diazo compound which cannot be used together with an azo dyestuff coupling component by saturating the exposed surface of such exposed print throughout its entire area with a developing liquid con-

taining a non-volatile alkaline substance and an azo dyestuff coupling component in the form of a uniformly thin film; and the fourth group is essentially directed to a developing liquid containing a non-volatile alkaline substance and saturating the exposed surface of the exposed print throughout its entire area with such developing liquid in the form of a uniformly thin film by momentarily wetting the exposed surface with an excess of the developing liquid and removing the excess immediately thereafter.

THE LAW.

The patent decisions have pointed out certain classes of facts conducive to the sustaining of patents. Since we believe that the present record establishes every one of these classes of fact in a most forcible manner, we will, under appropriate headings, quote from the decisions (principally of the C. C. A. and of the Supreme Court) and in connection therewith briefly state wherein the facts surrounding the Van der Grintens' invention show every principle persuasive of validity.

All of the Existing Facts Emphasize the Prima Facie Validity of the Reducing Agent Patent No. 1,821,281.

These facts were never better stated than by the late Judge Baker speaking for C. C. A. 7 in *Railroad* v. *Hart*, 222 Fed. 274 as follows:

> Not merely has the application been examined on behalf of all the people by experts who have access to all the prior patents and publications of the world; not only has the applicant spent his time and invested his money in procuring the patent; but in most of the important cases the patentee and those working under him have invested very large sums in buildings and machinery and have expended other large sums and put in great energy and effort to build up, by advertising and salesmanship, a profitable business. and this is done before any one challenges the presumptive validity of the patent. Courts therefore

should not view the application as of the date of its filing and constitute themselves into a board of reviewing examiners and on nicely balanced considerations find that the Patent Office examiners were in error; but they should consider the patentee's equalities in his business which has developed under the presumptive validity of the patent, should give heed to the place achieved by the patented article in the field of the practical art since the date of the patent, and should therefore decline to sustain the defense of non-invention, and to strike down the patent and the business built upon it unless that defense has been established beyond a reasonable doubt."

The instant record most emphatically surrounds the Van den Grintens' invention with all of these facts. Such publications and patents referred to by the defendant-appellee were so universally known in the art that the Examiner undoubtedly "had access" to them and manifestly did not cite them against Van der Grintens' claims because he realized their irrelevancy.

The Van der Grintens to an unusual extent "spent their time and invested their money" for years in making the invention and "those working under" their patent had "invested" and "expended" "money" and "energy" without stint to build up a "profitable business" before any one "challenged the presumptive validity of the patent."

To "strike down the patent and the business built upon it" in this case would include the intricate and elaborate organization for serving the public and the trade.

See also *Eibel* v. *Minnesota,* 261 U. S. 60, *Cantrell* v. *Wallick,* 117 U. S. 689, *Du Bois* v. *Kirk,* 158 U. S. 58.

The Van der Grintens' Addition to the Sum of Human Knowledge Created a New Industry.

O'Rourke v. *McMullen,* 160 Fed. 938, C. C. A. 2:

"The principal question in such cases is: Has the patentee added anything of value to the sum of hu-

> man knowledge, has he made the world's work easier, cheaper and safer, would the return to the prior art be a retrogression? When the court has answered this question, or these questions, in the affirmative, the effort should be to give the inventor the just reward of the contribution he has made. The effort should increase in proportion as the contribution is valuable. * * * The keynote of all the decisions is the extent of the benefit conferred upon mankind. Where the court has determined that this benefit is valuable and extensive it will, we think, be difficult to find a well considered case where the patent has been overthrown on the ground of non-patentability."

It is established here that the "benefit conferred on mankind" by the Van der Grinten invention was a diazo print with a background in which discoloration was arrested. There is no contradiction of the foregoing by the defendant-appellee.

There can be no question that the Van der Grintens' contribution to the "sum of human knowledge" of the importance of arresting the discoloration of the background was the key to satisfactory, acceptable and successful diazotype prints and created that new industry.

The creation of a new industry has always been accepted as sufficient reason for sustaining a patent.

Hobbs v. *Beach,* 180 U. S. 383, 392:

> "While none of the elements of the Beach patent—taken separately or perhaps even in a somewhat similar combination—was new, their adaptation to this new use and the minor changes required for that purpose resulted in the establishment of practically a new industry."

Outlook Co. v. *Cupples,* 223 Fed. 331, 338, C. C. A. 2:

> "We are satisfied that the Slater machine practically created a new industry * * *, Slater being the first person who succeeded in producing an automatic

machine for making window envelopes, he was entitled under the law to a liberal construction of the terms of his patent * * * and the principle of the patent law is well established in this country, and indeed in England as well, that a liberal construction is to be given to a patent of the class to which the one in suit belongs."

The Van der Grintens Supplied a Long Felt Want.

George Frost v. *Cohn,* 119 Fed. 508 C. C. A. 2:

"'When the substitution has accomplished a result which those skilled in the art had long and vainly sought to effect, the evidence that it involved something beyond the skill of the calling is so persuasive that it generally resolves the enquiry in favor of patentable novelty.'"

The same principle was applied by the Supreme Court in the following cases among many others:

Potts v. *Creager,* 155 U. S. 609;
Kremmetz v. *Cottle,* 148 U. S. 560;
Barbed Wire Patent, 143 U. S. 283;
Gandy v. *Belting Co.,* 143 U. S. 594;
Dubois v. *Kirk,* 158 U. S. 63.

The most quoted expression of the Supreme Court on the subject was the following in *Webster Loom Co.* v. *Higgins,* 105 U. S. 591:

"It may have been under their very eyes, they may almost be said to have stumbled over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. Who was the first to see it, to understand its value, to give it shape and form, to bring it into notice and urge its adoption, is a question to which we shall shortly give our attention."
* * *

"Now that it has succeeded, it may seem very plain to anyone that he could have done it as well. This is often the case with inventions of the greatest merit."

This record establishes that the qualities of the Van der Grintens' Diazo Prints render them superior to all others which had been well known for over half a century. Van der Grinten himself realized it as early as the close of the Great War, and the art shows that it was appreciated by scientific men in general at least as early as 1890 that diazo prints were unsatisfactory and were subject to discoloration in the background. The number of still-born recipes that had been suggested is a multitude.

The Numbers Interested in Solving the Problem Were Large and Widely Distributed.

The Amended Answer of the defendant-appellee shows the enormous number of researchers and investigators who are mentioned in the various patents and publications as having been at work on the diazo print problem without bearing any individual fruit. These included men of the most outstanding knowledge and ability.

The decisions are unanimous that this state of facts is a demonstration of patentability.

Eibel Co. v. *Minnesota Paper Co.,* 261 U. S. 45, 68:

> "The fact that in a decade of an eager quest for higher speeds this important chain of circumstances had escaped observation, the fact that no one had applied a remedy for the consequent trouble until Eibel, and the final fact that when he made known his discovery, all adopted his remedy, leave no doubt in our minds that what he saw and did was not obvious and did involve discovery and invention."

Schenck v. *Singer,* 77 Fed. 844, C. C. A. 2:

> "This evidence (of invention) is supplied by the * * * sterility during twenty years of the great army of mechanics employed by the various * * * manfacturers."

Brunswick v. *Thum,* 111 Fed. 904, 905, C. C. A. 2 Lacombe J.

> "But in this case, as in the *Singer* Case, the evidence shows conclusively, and, indeed without contradiction, that this very demand for an arrester of the returning ball was before skilled mechanics for many years, and yet no one before Reisky hit upon the device which now seems so obvious."

Permutit Co. v. *Harvey,* 279 Fed. 713, 720 and 721, C. C. A. 2:

> "The apparatus of the patent in suit produces a new result. It is one for which the chemists had searched in vain for half a century."

Yablich v. *Protecto,* 21 Fed. (2d) 885, 887, C. C. A. 3:

> "Did the solution rise to invention or was it merely the result which anyone skilled in the art would have reached? That of the scores of experts in the army, who were skilled in the art, and who were trying to solve this problem, the patentees alone did it, is a persuasive answer."

Problems Involving Latent Difficulties.

In the following we have quoted Judge Buffington who speaking for the C. C. A. 3 in *Consolidated* v. *Window Glass,* 261 Fed. 373, used the apposite language:

> "It is to be noted that the inventions made involve, as stated by Judge Thompson in the extract quoted above the unusual feature of first locating or discovering the difficulty to be overcome and its relation to the whole problem, before any inventive steps were taken to solve it. In other words, these patents involve, so to speak, two series of inventions: First, discovering the difficulty; and, second, discovering means to overcome that difficulty."

The same view of the law has been adopted by the C. C. A. of the 2nd circuit and tersely expressed in

Miehle v. *Whitlock,* 223 Fed. 647, 650, C. C. A. 2:

> "Patentable novelty is sometimes found in discovering what is the difficulty with an existing structure and what change in its elements will correct the difficulty, even though the means for introducing that element into the combination are old and their adaptation to the new purpose involves no patentable novelty."

We contend that the Van der Grintens had to go through these two steps of first discovering the root of the difficulty and then discovering the remedy; the root of the difficulty being the cause of the discoloration of the background and the remedy being the inclusion of a reducing agent in the background of a diazotype print to arrest discoloration.

Publications So Ambiguous that Their Result is Uncertain Do Not Anticipate.

Anticipation by ambiguous publications and patents is obnoxious to the following authorities:

Badische v. *Kalle,* 104 Fed. 806 C. C. A. 2:

> "And that description must be such as to show that the article described in the patent can be certainly arrived at by following the description."

Badische v. *Kalle,* 94 Fed. 170, Coxe J.

> "The proof leads to the conclusion that although some chemists might have used and, perhaps, did use the correct quantity of alkali, there was no definite and certain guide on the subject."

Seymour v. *Osborn,* 78 U. S. 555:

> "Mere vague and general representations will not support such a defence as the knowledge supposed to be derived from the publication must be sufficient to enable those skilled in the art or science to understand

the nature and operation of the invention and to carry it into practical use. * * * the account published, to be of any effect to support such a defence, must be an account of a complete and operative invention capable of being put into practical operation."

Permutit Co. v. Harvey, 279 Fed. 719, C. C. A. 2:

"If prior patents and publications can be reconstructed by extraneous efforts to fit the exigency of the case, it would, as was said in Badische Anilin & Soda Fabrik v. Kalle & Co., 104 F. 802, 44 C. C. A. 201, require an inquiry, not only as to what the publication communicates to the public, but 'it will be transferred to an endeavor to ascertain what its author intended to communicate.' We cannot read into this article what is not there, and which it would be necessary to obtain from the later development of the art in order to meet with appellee's success."

American Stainless Steel Co. v. *Ludlum,* 290 Fed. 103, 105 C. C. A. 2:

"This record is replete with accounts of speculations on this subject and dissertations thereon by men confessedly skillful in their day in the arts of steel making and metallurgy. These publications have been advanced by defendant to minimize the inventive concept of Haynes and Brearley. To us they magnify it. There are many inventions which seem to have been gathered, as it were, from the scrap heaps of human effort. They appear to observers as the results of accident, rather than intelligent design. But where men, doubtless well equipped for a particular sort of work, have hoped and investigated and even prophesied as to what could be done, but never did it, and other men similarly equipped have by intensive study and skillful experiment succeeded, such success commands and should receive a greater meed of intellectual appreciation than is accorded even to the cleverness of picking up and utilizing an unconsidered or discarded trifle. When to the scientific triumph of succeeding where other scientists have failed is added the development of a new branch of industry, the word

'pioneer' may well be accorded to the patent which describes and defines, even though lamely, the essentials of such success.

Half a century ago Woods and Clark (British No. 1,923 of 1872) filed a provisional specification for an 'improved alloy for anti-acid metal'; but they never completed their application. Of this abandoned disclosure defendant declares that these men 'taught the world * * * that high chromium ferrous alloys, consisting of low carbon Bessemer steel and high chromium content, with more or less tungsten' could be used to produce stainless alloys, and it is urged that the 'patents in suit have added nothing to that knowledge'. On the contrary, our inference is that Woods and Clark must have thought little of their own concept, as they dropped the matter at once * * *. They were perhaps among the prophets; but it requires more than prophecy of what may be done, or than declarations of what ought to be accomplished, to make a good patent reference, not to speak of an anticipation. It is necessary to show with reasonable certainty how the desired result can be accomplished. Westinghouse, etc. Co. v. Great Northern Co., 88 Fed. 258, 31 C. C. A. 525."

Cimiotti v. *Comstock,* 115 Fed. 524:

"A document so obscure in its terminology that two conflicting theories may be deduced therefrom and supported by equally plausible arguments is too indefinite to be utilized as an anticipation."

Skelly Oil Co. v. *Universal Products Co.,* 31 F. (2d) 427; 431; C. C. A. 3:

"A patent relied upon as an anticipation must itself speak." * * *

"A singularly sensible test of the rule of anticipation is given in British Thomson-Houston Co. v. Metropolitan Vickers Electrical Co., 45 R. P. C. 22, by asking the question, 'Would a man who was grappling with the problem solved by the patent attacked, and having no knowledge of that patent, if he had had the

alleged anticipation in his hand, have said: "That gives me what I wish"?' "

Unwitting or Unappreciated Use Is Not Anticipation.

We deny that it has been proven that prior to Van der Grinten any process for arresting the discoloration of the background of a diazotype print was used or sufficiently described, or, in fact, ever existed. But even if we were to suppose for the sake of the argument that such a thing existed by chance without appreciation of significance or importance of the ratio it would not, in law, constitute anticipation.

Eibel v. *Paper Co.,* 261 U. S. 45, 66:

> "It is contended on behalf of the defendant that whether Barrett and Horne perceived the advantage of speeding up the stock to an equality with the wire, yet the necessary effect of their devices was to achieve that result and therefore their machine anticipated Eibel. In the first place, we find no evidence that any pitch of the wire, used before Eibel, had brought about such a result as that sought by him, and in the second place if it had done so under unusual conditions, accidental results, not intended and not appreciated, do not constitute anticipation. Tilghman v. Proctor, 102 U. S. 707, 711; Pittsburgh Reduction Co. v. Cowles Electric Co., 55 Fed. 301, 307; Andrews v. Carman, 13 Blatchf. 307, 323."

Wickelmann v. *Dick,* 88 Fed. 264, 266 and 267, C. C. A. 2:

> "chance operation of a principle, unrecognized by anyone at the time and from which no information of its existence and no knowledge of the method of its employment is derived by anyone, if proved to have occurred, will not be sufficient to defeat the claim of him who first discovers the principle; and, by putting it to practical and intelligent use, first makes it available to man."

United Verde Co. v. *Pierce-Smith Converter Co.*, 7 F. (2) 13, 16, C. C. A. 3:

> "But if it ever protected the basic lining (which was by no means proved) it was accidental. The patentees did not know it, or, knowing it, they did not tell it to the art. It is only in the light of what Smith afterward discovered, and did, that the disclosures of the Baggaley and Allen patent have any application to Smith's problem. But the important thing is that, if, in the light of Smith, the Baggaley and Allen method can be used to protect a basic lining, Baggaley and Allen * * * did not suggest even remotely the idea of Smith * * *."
>
> "If in this operation Heywood's workmen at anytime hit upon the amount and composition of the flux required by the Smith process and attained its result, it was properly accidental and was without profit to the art and without value as an anticipation."

In *Pittsburgh Reduction Co.* v. *Cowles*, 55 Fed. 301, 307, above cited in the Supreme Court, Judge Taft said:

> "But suppose it to be a fact that in DeVille's process alumina was dissolved in the bath from the anode, and that thereupon it was electrolyzed as in the Hall process, it was a mere accident, of which DeVille made no note, and which, therefore, we must reasonably infer he did not observe. Accidents of this character cannot be relied on as anticipations of a patented process when the operator does not recognize the means by which the accidental result is accomplished, and does not thereafter commercially and purposely adopt such means as a process for reaching the result."

Walker on Patents, 6th Edition, Sec. 106, Page 130:

> "Novelty is not negatived by any prior accidental occurrence or production, the character and function of which was not recognized until later than the date of the patented invention sought to be anticipated thereby. Tilghman v. Proctor, 102 U. S. 711, 1880; Pittsburgh Reduction Co. v. Cowles Electric Co., 55 F. R. 307, 1893; Chase v. Fillebrown, 58 F. R. 377,

1893; Wickelmann v. A. B. Dick Co., 88 F. R. 266, 1898; Tannage Patent Co. v. Donallan, 93 F. R. 821, 1899; Ajax Metal Co. v. Brady Brass Co., 155 F. R. 409, 1907; Western Tube Co. v. Rainer, 156 F. R. 49, 1907; Hillard v. Fisher Book Typewriting Co., 159 F. R. 439, 1908; Edison Electric Lighting Co. v. Novelty Incandescent Lamp Co., 167 F. R. 977, 1909; Anthracite Separate Co. v. Pollock, 175 F. R. 108, 1909; Byerly v. Barber Asphalt Paving Co., 230 F. R. 995, 1916; Toch v. Zibell Damp Resisting Paint Co., 233 F. R. 993, 1916; United Verde Copper Co. v. Pierce-Smith Converter Co., 7 F. (2d) 13, 16, C. C. A. 3rd Cir.; Carson v. Am. Smelting & R. Co., 11 F. (2d) 766, C. C. A., 9th Cir."

The Great Number of References Cited in Defendant's Answer and Amendment is Indicative of Invention.

Defendant pleaded numerous patents and publications, extending from the year 1890 to the year 1926. The significance of the following decisions is obvious:

Forsyth v. *Garloch,* 142 Fed., 461, 463, 464; C. C. A. 1:

> "the citation of so many patents by a respondent in an infringement suit sometimes tends, as we have several times said, not so much to weaken the complainant's position, as to strengthen it, by showing that the trade had long and persistently been seeking in vain for what the complainant finally accomplished."

Scott v. *Fisher,* 145 Fed. 915, 916, C. C. A. 2:

> "That the construction of a machine capable of producing such a fabric was not obvious appears from the 31 prior patents introduced by defendants, no one of which showed a solution of the problem."

Draper v. *American,* 161 Fed. 728, 730, C. C. A. 1:

> "we have not only the persistency of the respondent corporation in availing itself of the complainant's improvement, but also a mass of alleged anticipatory patents introduced by it, both of which indicate the desirability of something better than the prior art."

An Erroneous Explanation of the Rationale or Theory of the Process in a Patent Is Not Fatal.

Dr. Loevenich, unsupported, has expressed the opinion that Van der Grinten's oxidation and reduction theory is an erroneous explanation of the reason for success. Dr. Van der Grinten still upholds this theory with ample reasons and in this conflict of fact the prima facie effect of the patent must prevail.

But even if the oxidation and reduction theory were erroneous it would not impair the validity of the patent under the following authorities:

Eames v. *Andrews,* 122 U. S. 40;
Diamond v. *Consolidated,* 220 U. S. 435;
Ward v. *Hazelton,* 292 Fed. 202, 206;
Westinghouse v. *Montgomery,* 153 Fed. 890, 901;
U. S. Co. v. *Theroz Co.,* 25 Fed. (2d) 387, 390.

CONCLUSION.

It is respectfully submitted that the portion of the Decree of the District Court (Paragraph XVI) which decrees that claims 3, 4, 7, 8, 16, 40 and 41 of United States Letters Patent No. 1,821,281 are not infringed by defendant-appellee should be reversed; and that defendant-appellee's Diepo Direcprint Paper containing Thiourea be held to be an infringement of claims 40 and 41 and the use of such paper be held to be an infringement of claims 1, 3, 4, 7, 8, and 16; that thiourea be held to be a reducing agent within the Reducing Agent Patent; and that plaintiffs-appellants

be awarded an appropriate decree granting a perpetual injunction, an accounting of profits and damages and costs.

Respectfully submitted,

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APPENDIX.

DEFENDANT'S EXHIBIT A.

Reichspatentamt

To. P. A. Nr. 965,400 A. A. iVb
Berlin,
February 26, 1931.

DECISION.

After due publication and after examining the opposition raised, a patent is granted on the application of Kalle & Co., A. G., of Wiesbaden-Biebrich, which patent runs from the 17th February 1928 and is titled:

> "Process for making diazo photographic prints lasting"

and is granted on the basis of the documents laid open for inspection. The above alteration in the title is substantiated below.

Reasons.

The opposition is firstly based on illegal acquisition. This ground of the opposition is not tenable, as only unproven presumptions have been uttered, against which there is the declaration in lieu of oath made by the inventors of the 12th September 1929.

Secondly, evident prior use by offering and bringing on the market in inland of a paper manufactured according to the application is asserted. As against this the applicants rightly state that, even in case such papers came into trade, nobody would have been induced to test the papers for thiocarbamide and similar sulphur-containing compounds, and that in addition the establishing of the stabiliser present only in small quantities in the paper, about 1 gramme per square meter, is very difficult, especially as there would have been a complicated mixture of organic compounds in the layer.

Thirdly, the French patent specification 633,319 and the German application C. 39,700 I Vb/57, which has an older priority and substantially coincides with the French patent specification 633,319 has been cited. Even if the latter is to be taken into consideration only by virtue of Article 3 of the Patent Act, its claims, especially the claims very near to the present application, 1 and 2 as well as 6 and 7, are so detailedly worded, that both citations can be dealt with here simultaneously. Claims 1 and 6 say, inter alia, that the picture layer or the "light-sensitive layer" should contain aliphatic amino compounds. Thiocarbamide, however, cannot be considered as a simple "aliphatic amino compound" in the sense of the mentioned application, and nobody could understand from the wording of the said claims the rule, that just thiocarbamide is a specially effective stabiliser.

In the claims 2 and 7 and in the corresponding passages of the French patent specification it is proposed adding besides the reducing media (i. e., the aliphatic amino compounds) also such substances (antioxygenes according to Moureu), which act catalytically against an oxydation even in quantities, which are not sufficient to cause an oxydizing effect, without being themselves real reducing media. This wording is not absolutely clear. It becomes clear, however, when taken together with Page 2, Lines 74-80 of the French application (French patent specification 633,319), which creates the priority. There it is stated that only "des quantites excessivement faibles" of these substances, amongst which Moureu also mentions thiocarbamide, and to wit "in conjunction with reducing media", should be used.

Both of these do not relate to the present process, and therefore the cited passage from Comptes rendus de l'academie des sciences need not be referred to at all. Moreover in Vol. 175 (1922, II) it can be seen from the work of Moureu and Dufresne, Sur l'antoxydation, Page 128, Line 12 from the bottom that the numerical data concerning the quantities of the antioxygenes relate to pure acrolein and

that, as can be seen from Table Fig. 2 on page 129, the oxydation of the acrolein is practically stopped by an "antioxygene" in a quantity between $\frac{1}{40000}$ and $\frac{1}{100,000}$ in this case hydroquinone.

As against these quite extremely small quantities many times the quantity of thiocarbamide, calculated on diazo compound, is added according to the Examples 1 and 2 of the present application, and about 1½ times the quantity according to Example 3 of the present application.

Accordingly it is a matter of completely different kind of process, quite apart from the fact that thiocarbamide here is not used together with reducing media.

That small amounts of thiocarbamide do not have the effect achievable according to the process of the application, is shown in the Table I A, Nr. 2; I B, Nr. 10; II A Nr. 2; II B Nrs. 8 and 9 as well as III A. Nr. 2 and III B, Nrs. 8 and 9, enclosed with the communication of the applicants of September 13, 1929.

The citations do not therefore oppose as prior publications and there is no collision with the application C. 39,700 IVb/57b having an older priority.

There was, therefore, no substantial reason for refusing the patent applied for.

Application Department IV b

sgd. Dr. Rolle, Dr. Mai, Dr. Grote.

Reichspatentamt
To the Patent Roll:

a) for entering the patent into the Patent Roll according to form B.

entered on May 6th 1931
under Nr. 526,370, Class 57 b, Group 12.

b) for informing the owner of the patent;
c) for causing the patent specification to be printed,

done on 7th May 1931.

d) for publication of the entry;

published on 13th May 1931,
entered on 6th May 1931.

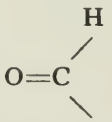
Berlin, 30th April 31.
Application Department
sgd. Signature.

GLOSSARY.

ACETATE — A compound of acetic acid CH_3COOH, hence containing the acetate group (CH_3COO).

ACID (ACIDIC) (ACIDIFY) — The opposite of alkaline.
If an acid substance be added in small increments to a solution of an alkaline substance, it reduces the alkalinity of the system progressively until a neutral point is reached at which they balance each other. Further addition of acid substance will make the system acid.

ALDEHYDE — An organic compound containing the following group:



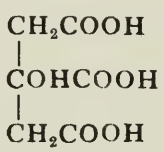
ALIPHATIC — A broad classification of organic compounds which includes the compounds derived from the hydrocarbons of the open chain series as distinguished from those of the aromatic compounds.

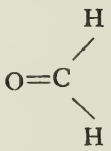
ALKALINE (ALKALI) (BASIC) (BASE) — The opposite of acid.
If an alkaline substance be added in small increments to a solution of an acid substance, it reduces the acidity of the system progressively until a neutral point is reached at which they balance each other. Further addition of alkaline substance will make the system alkaline.

AMIDO and AMINO — Interchangeable prefixes used to denote the presence of the (NH_2) group. Some authors prefer to restrict AMIDO to aromatic compounds and AMINO to aliphatic compounds, but this is optional.

AMMONIA — The compound NH_3 which is the commonest example of a volatile alkali. In water solution, it becomes ammonium hydroxide NH_4OH, of which ordinary "household ammonia" is one form.

AROMATIC — A broad classification of organic compounds derived from benzene and retaining the ring or closed chain formation of benzene, as distinguished from the aliphatic compounds.

AZO	A prefix denoting compounds containing the group (—N=N—), united on both sides to an aliphatic or aromatic group.
AZO DYESTUFF COUPLING COMPONENT	An organic compound capable of coupling or combining with a diazo compound, under suitable conditions, to form an azo dyestuff or color.
C	Chemical symbol for one atom of carbon.
CHLORIDE	A salt of hydrochloric acid HCl or a substance in which hydrogen has been replaced by chlorine.
Cl	Chemical symbol for one atom of chlorine.
CITRIC ACID	An aliphatic organic acid contained in many fruits. Its formula is: 
Cu	Chemical symbol for one atom of the metal copper.
CUPRIC	The term denoting copper in its higher state of oxidation in which it has a valence of 2, i. e. Cu++.
CUPROUS	The term denoting copper in its lower state of oxidation, in which it has a valence of 1, i. e. Cu+.
DIAZO	A prefix denoting compounds containing the group (—N=N—), united on one side to an aliphatic or aromatic group, the other side being free to couple.
DIAZOTYPE	The branch of photography, based on: (1) The ability of certain diazo compounds to couple with azo dyestuff coupling components under suitable conditions to form an azo dyestuff or color. (2) The decomposition of certain diazo compounds under the influence of light to produce essentially white or colorless compounds incapable of forming an azo dyestuff or color with azo dyestuff coupling components.

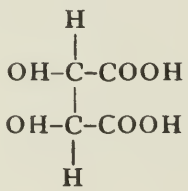
Fe	Chemical symbol for one atom of the metal iron.
FERRIC	The term denoting iron in its higher state of oxidation, in which it has a valence of 3, i. e. Fe+++.
FERROUS	The term denoting iron in its lower state of oxidation, in which it has a valence of 2, i. e. Fe++.
FORMALDEHYDE	An aliphatic organic compound of formula 
H	Chemical symbol for one atom of hydrogen.
HYDROGEN PEROXIDE	The liquid compound H_2O_2. It acts as an oxidizing agent except in special cases.
HYPO	A commonly used chemical "nickname" for sodium thiosulfate, $Na_2S_2O_3$, a well-known reducing agent.
INORGANIC	A broad classification of substances denoting those containing no carbon.
N	Chemical symbol for one atom of nitrogen.
Na	Chemical symbol for one atom of the metal sodium.
NEGATIVE PRINT	A print in which the letters, lines, etc. of the image are in white or other light color on a black or other dark-colored background.
NON-VOLATILE	Not evaporating at ordinary temperatures upon exposure to the air.
O	Chemical symbol for one atom of oxygen.
ORGANIC	A broad classification of substances denoting those containing carbon. Exceptions are carbonates, cyanides and other simple carbonic derivatives, which are usually considered inorganic.
OXIDATION (OXIDIZE) (OXIDIZING)	(1) The addition of oxygen or an equivalent negative element or group (chlorine, sulfur, nonmetals, etc.) to an element or compound.

	(2) The removal of hydrogen or an equivalent positive element or group (metals, etc.) from a compound.
	(3) The increase in the positive valence of a metal, from the "-ous" form to the "-ic" form.
OXYDIPHENYL-AMINE (PARA)	The compound $C_6H_5NHC_6H_4OH$ which, then oxidized by mercuric oxide in benzene solution, forms quinone monoanil $C_6H_5NC_6H_4O$, a fiery red compound.
POSITIVE PRINT	A print in which the letters, lines, etc. of the image are in black or other dark color on a white or light-colored background. Thus, ordinary newsprint is positive.
QUINONE MONOANIL or QUINONMONO-ANIL	The fiery red compound $C_6H_5NC_6H_4O$ formed from para oxydiphenylamine $C_6H_5NHC_6H_4OH$ by oxidation in benzene solution with mercuric oxide.
REDUCTION (REDUCE) (REDUCING)	(1) The removal of oxygen or an equivalent negative element or group (chlorine, sulfur, nonmetals, etc.) from a compound.
	(2) The addition of hydrogen or an equivalent positive element or group (metals, etc.) to an element or compound.
	(3) The decrease in the positive valence of a metal, from the "ic" form to the "-ous" form.
S	Chemical symbol for one atom of sulfur.
SILVER	The semi-precious metallic element, of which the chemical symbol for one atom is Ag. The light-sensitivity of certain silver compounds is the basis of ordinary photography.
SODIUM	The metallic element of which the chemical symbol for one atom is Na.
SODIUM CARBONATE	The most important industrial alkali, a white, nonvolatile, inorganic, solid compound of formula Na_2CO_3.

SODIUM THIOSULFATE or "HYPO" — The inorganic compound $Na_2S_2O_3$, which is a well-known reducing agent.

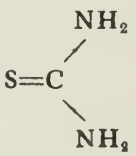
SULFUR — The yellow non-metallic solid element, of which the chemical symbol for one atom is S.

TARTARIC ACID — The aliphatic organic acid of formula



THIOCARBAMIDE — A synonym for thiourea.

THIOUREA or THIOCARBAMIDE — The organic aliphatic amino compound of formula



VALENCE — The chemical reacting power of an element expressed as the number of atoms of hydrogen or chlorine which an atom of the element can combine with or displace. In general, hydrogen and metals have positive valences; while chlorine and other non-metals have negative valences.

VOLATILE — Evaporating at ordinary temperatures upon exposure to the air.